Farm Chemicals

Pioneer Journal
of the Industry

UNIVERSITY OF MINNESOTA
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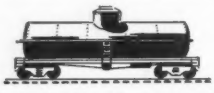
PHILLIPS OFFERS

5 FERTILIZER MATERIALS FOR HIGH ANALYSIS MIXTURES

1 AMMONIUM SULFATE

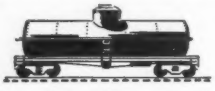
New Premium Quality Phillips *66* Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture—prevent caking. Uniform, dust-free crystals flow freely—mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

2 ANHYDROUS AMMONIA



Phillips *66* Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston, Texas.

3 NITROGEN SOLUTIONS

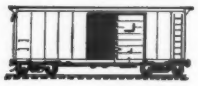


Get more N per dollar! There are three Phillips *66* Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep handling costs low, help rapid, thorough curing.

4 AMMONIUM NITRATE

Phillips *66* Prilled Ammonium Nitrate contains 33% nitrogen. The small, coated prills or pellets resist caking . . . handle easily. Depend on Phillips *66* Prilled Ammonium Nitrate for uniform, free-flowing properties in formulations and top-notch crop response as a direct application material.

5 TRIPLE SUPERPHOSPHATE



Phillips *66* Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high analysis fertilizers.

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

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Why it pays you to sell

aldrin and dieldrin

Intensive national advertising builds top consumer acceptance for these powerful Shell insecticides... helps you sell your own brand!

Powerful timely advertising in magazines, newspapers, on radio and television is telling your customers how they can benefit from a cotton control program with aldrin and dieldrin. This advertising is planned to appear when growers are getting ready to start their control program. You can profit from this heavy advertising support by stocking these powerful Shell insecticides and recommending them to your customers.

Aldrin makes up easily in dusts, or emulsible concentrates for spray application. It provides fast kill—high kill of the major cotton pests. It is compatible with other insecticides such as DDT, parathion and aramite. Recommend that your customers use aldrin for their all-season cotton pest control program.

Dieldrin—aldrin's famous insecticide twin—provides long residual action. It's especially valuable for control in dry, windy areas. Dieldrin, too, is available in dusts or emulsible concentrates.

FOR GRASSHOPPERS

Aldrin and dieldrin are recognized as the Number One grasshopper control both in the United States and abroad. Only a few ounces per acre provide as high as 99% control, regardless of how heavy the intestation.

Both aldrin and dieldrin are backed by state and federal labels and recommendations. Start to make extra profits today—stock, display, sell both aldrin and dieldrin!

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AGRICULTURAL CHEMICALS DIVISION

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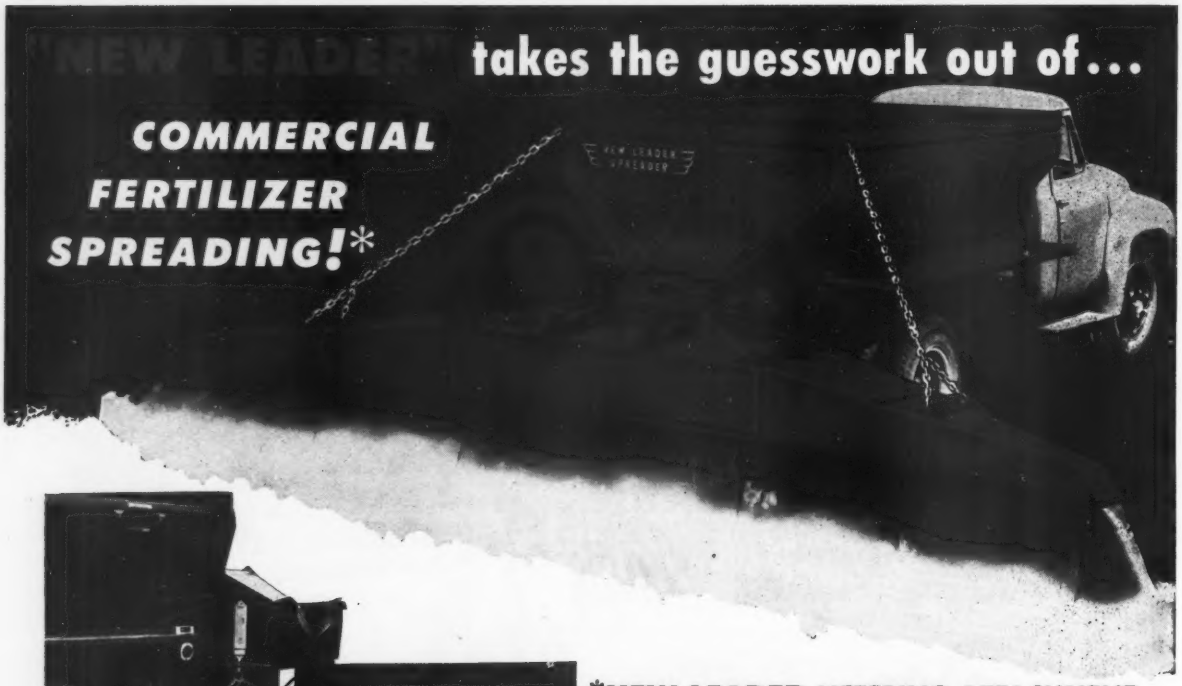
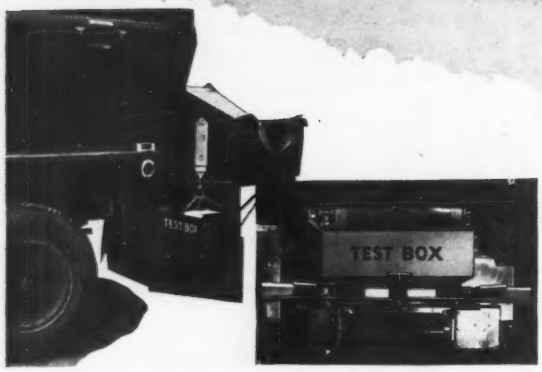
"NEW LEADER" takes the guesswork out of...

COMMERCIAL FERTILIZER SPREADING!*





*NEW LEADER METERING ATTACHMENT ASSURES EXACT SPREAD PER ACRE!

Here's another *New Leader* engineering first! A simple, foolproof mechanism—the *New Leader* Metering Attachment takes all guesswork out of commercial fertilizer spreading. By accurately measuring the amount of fertilizer being fed to the twin distributor discs, correct feedgate settings are obtained. Accurate metering of spreads of from 100 pounds per acre up are assured. This is a feature beneficial to fertilizer manufacturers, suppliers, custom operators and farmers alike.

Motor-driven twin distributor discs and drive-shaft driven conveyor is the answer to the most accurate truck mounted spreader in the world.

COMBINATION SPREADER (with Hood in Road Travel or Lime Spreading Position)
Set the feedgate, drive straight and you can't miss getting an accurate spread. Conveyor is geared to ground speed assuring an accurate flow of material. The twin distributor discs are powered by a separate auxiliary engine, which assures you of a constant width of spread, regardless of the speed of the truck.

NEW LEADER LIME SPREADER
Twin distributor discs, 24" wide conveyor and large feedgate opening eliminates bridging of material and assures accurate, more even spreads.

"NEW LEADER" Self-Unloading Transports deliver more materials FASTER . . . AT LESS COST!

Write today for information and prices

Here's one sure way to increase your tonnage and prolong your season by providing commercial fertilizer in bulk to your dealers! The NEW LEADER Self-Unloading Bulk Transport giving your dealers bulk delivery of fertilizer when and where they want it. In addition to mixed goods the NEW LEADER Self-Unloading Bulk Transport can be equipped to haul bagged materials when necessary. Many companies recognize this method of distribution and find that it has reduced many problems such as storage, extra inventory, etc.

Write, Phone or Wire today for complete information, specifications and prices!

HIGHWAY EQUIPMENT CO., INC.

MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS AND BULK DELIVERY EQUIPMENT

In this issue . . .

Few active APFC or NFA participants are expected to miss the first meeting of the National Plant Food Institute, a preliminary convention at the Greenbrier on June 12–15. Attendance of over 800 is anticipated. On page 30 is a brief review of scheduled activities and the speakers and panels that will highlight the sessions.

Rodney C. Berry, Virginia control official, has conducted another fertilizer-pesticide mixtures survey among the state control officials in preparation for his part in a panel on the subject to be presented at the NPFI convention. For a summary of the information that he has compiled and released, see pages 32-34.

Final figures on 1953–54 fertilizer consumption have been released by Walter Scholl and Beltsville associates and appear in their entirety beginning on page 37. Although fertilizer tonnage dropped 2 per cent, primary plant nutrient consumption reached another high, up 4.4 per cent above the previous year.

Turn to page 52 for a brief run-down on the data contained in Harold Shepard's pesticide situation report. One of the most interesting facts is the improvement in the inventory situation for both toxicants and formulations.

Potash deliveries continue to climb as noted on page 55 in the report based on data released by the American Potash Institute. Deliveries for both 1954 and the first quarter of this year set a new high for their respective periods.

New in this issue: A monthly Plant Safety Tip (No. 1 is on page 34). Your hard working associates in the Fertilizer section, NSC, have provided the data for a series of short features, based on actual plant experiences, which we hope you will find of real interest.

Cover story

A new transportation method is inaugurated by Freeport Sulphur co. as molten sulfur is loaded into a 2,500 ton capacity insulated barge for shipment up the Mississippi to a plant 1,100 miles and eight days away. Watching the operation are officials of Freeport Sulphur and of Coyle Lines, Inc. and Ingalls Shipbuilding corp., operators and builders of the barges respectively.

Farm Chemicals

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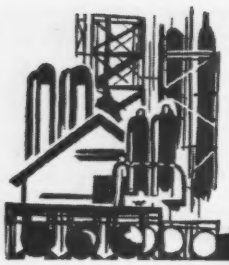


INDUSTRY NEWS

Begin Work on Calumet Plant

Construction of Calumet Nitrogen Products co.'s 300 ton per day NH_3 plant got under way May 9 at Hammond, Ind. It will be the first nitrogen products plant in the state and is to begin operation next spring.

Standard Oil co. (Indiana) will operate the plant for Calumet Nitrogen Products, a new company organized recently by Sinclair Refining co. and Standard.

J. H. Forrester, president of CNP, said the new plant will be staffed with personnel from Standard Oil's Whiting refinery.

"While definite plans have not been completed, he said, "it looks now as if about 80 Whiting refinery people will be assigned to the new nitrogen products plant." About half of these will be operators. Safety, fire fighting, medical and similar services will also be provided from the Whiting refinery.

Breaking ground for Calumet Nitrogen Products co.'s Hammond, Ind., plant. Left to right are Dr. Roger H. Bray, Univ. of Ill. agronomist; E. W. Griscom, vice pres. and J. H. Forrester, pres., CNP; Mayor Vernon Anderson and A. R. Bertrand, Purdue agronomist.

According to E. W. Griscom, vice president of the new company, products of the plant will be marketed for the most part in the Midwest. The two companies will sell their portions of the output independently under their own brands.

Sinclair Refining's East Chicago refinery and the Whiting refinery of Standard Oil (Indiana) will supply the plant with by-product hydrogen by pipeline.

Fluor corp. is general contractor for construction of the facilities, which are scheduled to be producing by May of 1956.

Ammonia produced in the plant will be stored in seven refrigerated storage spheres with a capacity of 19,000 tons. For shipments, a 20-spot railroad tank car loading rach and a two-spot tank truck rack will be provided. There will also be facilities to store about 200 railroad tank cars in preparation for peak shipping seasons.

One hundred tons of anhydrous ammonia a day will be converted into nitrogen solutions.

Among those who took part in the brief ground breaking ceremonies were J. H. Forrester, president, and E. W. Griscom, vice president, Calumet Nitrogen Products co.; Mayor Vernon Anderson of Hammond; Dr. A. R. Bertrand, Purdue University agronomist, and Dr. Roger H. Bray, University of Illinois agronomist.

Great Plains AAA Plans Trade Show, Field Day

The Great Plains Agricultural Ammonia Association Midwest Trade Show and F eld Day is scheduled for July 21 and 22.

James Andrew, association secretary, reports that the business session and show on July 21 at Hotel Ft. Des Moines are for members only, while the field day, being held in cooperation with Iowa State College at Ames on July 21, will be open to the public.

Details and reservations may be secured by writing to Andrew, Great Plains Agricultural Ammonia Association, Box 447, Jefferson, Iowa.

NFA Surveys Northwest, North, Mountain Areas

NFA spot surveys find sales up slightly in the Pacific Northwest and Mountain areas, down in the northern US east of the Rockies. Final totals are expected to be up as much as 5 per cent in first areas, within 5 per cent of 1953-54 in latter section.

In the Pacific Northwest and Mountain states, total tonnage of fertilizer sold from July 1, 1954 to late April, 1955, appears to be about 3 per cent greater than in the same period of 1953-54, based on reports from fertilizer companies doing business in the area. By the close of the full fertilizer year ending June 30, reports indicate that total tonnage may be up for the area as a whole as much as 5 per cent, the association states. On a plant food basis, reports indicate that sales will be even higher by a few per cent.

The spot survey conducted in the Northern half of the US, east of the Rocky mountains, showed sales for the period July 1, 1954, to mid-April running from 10 to 15 per cent behind sales for the corresponding 1953-54 period. Improvement is expected as the season progresses, so that for the full year ending June 30, total fertilizer sales may be within 5 per cent of 1953-54 shipments. On a plant food basis, sales for the whole year seem likely to approximate closely the 1953-54 total, NFA reports.

NFA Committee Plans Oregon-Washington Tour

The National Fertilizer Association's Plant Food Research committee has announced plans for a three-day tour of Oregon and Washington farms and state experiment stations on Aug. 10-12, with M. E. McCollam, of American Potash Institute, as chairman for the tour.

To be made by chartered plane, the 750-mile trip will begin at Portland, Ore.

Although large participation is not the objective of the Arrangements committee, the NFA News reported that Mr. McCollam would be glad to hear from any member of the industry who is interested in participating.

New APCO Publication, Pesticide Data Issued

APCO official publication and condensed data on pesticide chemicals volume is now available for distribution at $3.00 a copy.

The 1955 edition of the Pesticide Official Publication and Condensed Data on Pesticide Chemicals now is ready for distribution, the Association of American Pesticide Control Officials has announced.

The association said that several shortcomings noted in previous editions have been corrected; for example, the index has been extended to 14 closely spaced pages containing many of the common trade names under which pesticide materials are encountered in commerce. Number of chemicals covered has been increased to about 175, as more data have become available. Also included are official residue tolerances covering those materials for which they have been established and a report of the annual meeting of the association. Information included in former issues on model bills and the section on sampling procedure have been omitted.

The group plans to discontinue annual revisions with this issue, but supplements will be issued during the next few years until a new edition is in order.

Priced at $3, the book is available from A. B. Heagy, secretary of the association, Box HH, Univ. P.O., College Park, Md.

First Simplot Phosphoric Acid Shipped to Brea

The Fertilizer div. of J. R. Simplot co. recently shipped its first tank car of phosphoric acid to Brea Chemicals, the company reported in its SIMPLOT NEWS LETTER.

Simplot's Pocatello plant and parking area has been completely fenced in, with only two gates furnishing means of getting in and out. Everyone entering must now check in and out with the guard. Plant personnel have been furnished numbered identification buttons.

Farm Chemicals Receives Fourth Straight NSC Award

For the fourth straight year, FARM CHEMICALS is the recipient of a Public Interest Award for "exceptional service to safety."

Presented by The National Safety Council, the 1954 award went to 34 daily and 11 weekly newspapers, 84 radio and 26 television stations, one television and three radio networks, 10 general circulation and 30 specialized magazines, 18 advertisers and 24 outdoor advertising companies.

Tailings

Need help with your income tax records? A recent SBA booklet on how good records aid income tax reporting may be of assistance. Write the Small Business Administration, Washington, 25, requesting Management Aid No. 61 or contact your local SBA field office.

♦ ♦ ♦ ♦

Grain contamination doesn't always indicate filth. From Montana comes word that during the past summer some 60 carloads of fungicide-treated grain were condemned by Federal authorities in the Northwest because of the practice of dumping into farm storage bins, fungicide treated grains which were not seeded. It is known that at least 10 more cars of insecticide contaminated wheat were put on the market, but authorities could do nothing because the wheat was not shipped through interstate commerce.

♦ ♦ ♦ ♦

Some companies seem to be making considerable use of sample packing in their merchandising plans. Pack-It, 7 Brown St., Newark 5, N. J., specializes in this activity, imprinting polyethylene pouches and filling them with volume samples of your product from bulk. Distribution or mailing can also be handled by the organization.

♦ ♦ ♦ ♦

American Management Association has issued a hard bound handbook, "A Company Guide to the Selection of Salesmen" that may be of value to you. It analyzes the practices of 180 manufacturers in sales force selection and provides sample interview guides, etc. It's priced at $4.75 from the association at 330 W. 42nd St., New York City 36.

♦ ♦ ♦ ♦

You, too, can scale a fish like a pro. This month's mail was capped by the announcement of an automatic, portable, power Fish-Scale retailing at "just $19.95." This might be automation in some quarters, but we'll probably remain in the Do-It-Yourself class.

♦ ♦ ♦ ♦

More pesticides in the popular magazine spotlight. This time Shell's aldrin and dieldrin sisters were the subject of an article in the April CORONET magazine.

♦ ♦ ♦ ♦

Worthington corp.'s POWER AND FLUID magazine for Spring, 1955, included an article by H. E. Gallison on the TVA continuous ammoniator and Worthington's work in building such a unit for Minnesota Farm Bureau Services. A complete description is included.

♦ ♦ ♦ ♦

The March-April issue of NAC NEWS AND PESTICIDE REVIEW *contained an excellent feature on agricultural aviation. Good reception was indicated by the number of agencies distributing reprints.*

♦ ♦ ♦ ♦

Quote from Dwight Moody in the JOURNAL OF COMMERCE: "It would seem as consistent to ban use of bathtubs and home use of medical supplies such as iodine as to curb development of new farm chemicals on the basis that their misuse might be dangerous."

Entomology Program Wins Award

A program to win widest public understanding of the threat of insect pests and to gain public support and participation in insect control, conducted last year by the Entomology Centennial Commemoration committee under the slogan "Fight Your Insect Enemies," won a Silver Anvil award of the American Public Relations Association on April 22. Above, John H. Smith, Jr., APRA president, presents the award to David G. Hall of USDA, chairman of the winning group. Edwin H. Ginn (right), of Hercules Powder co., represents committee member H. R. Budd, director of advertising for Hercules, who served with the group on behalf of the National Agricultural Chemicals Association.

Pelton to Head Safety Insurance Committee

An Insurance Advisory committee has been set up by the Fertilizer section of the National Safety Council to make studies and keep in touch with the insurance picture, reports J. Lauren Shopen, chairman of public relations for the section.

Pelton

George L. Pelton, personnel director for The Smith Agricultural Chemical co., has been appointed chairman of the new committee. In 1937 Pelton joined Smith as timekeeper and worked his way up through the plant to assistant superintendent of the Columbus, O., plant. In 1949 he was made personnel director, a position which, at the Smith co., combines the functions of personnel, industrial relations and safety for all five of the company's plants.

Plan TVA Symposium

"Methodological Procedures in the Economic Analysis of Fertilizer Use Data" is the subject of a symposium to be conducted June 14-16 at Knoxville, Tenn., by TVA's Agricultural Relations div.

Among the participants will be Dr. Earl O. Heady, Iowa State College; Dr. Glenn Johnson, Michigan State College; Dr. Clifford Hildreth, North Carolina State College; Professors Frank F. Bell and W. L. Parks of the University of Tennessee. Other speakers will come from the University of Illinois, Purdue University and USDA.

Research workers from many states are expected to attend the conference to learn the latest techniques for such economic studies.

New MCA Chemical Industry Facts Book

A second edition of "The Chemical Industry Facts Book" is now available, reports the publisher, Manufacturing Chemists' Association. Containing 160 pages and 15 chapters, the Facts Book is profusely illustrated with charts, graphs and tables.

According to MCA, the second edition is more complete than the first, offering an additional 52 pages of information, including such features as a listing of trade asssociations and professional societies identified with chemical manufacturing.

Copies are available at $1.00 each, prepaid, from MCA, 1625 Eye Street, NW, Washington 6, D. C.

Spencer to Expand Vicksburg Works

Spencer Chem. plans $1.5 million expansion in nitric acid and Spensol facilities at Vicksburg, Miss. to serve Southeastern markets. In addition to capacity increase, company aims at greater flexibility, improved consumer service.

After studying several potential sites for this expansion, Spencer's board of directors determined that markets of Southeastern US could be best served by expanding Vicksburg facilities for processing ammonia into solutions.

At present the Vicksburg Works has sufficient nitric acid and Spensol capacity to convert 60 per cent of the anhydrous ammonia produced at the works into Spensol solutions. Spencer stated that a portion of the ammonia produced at Vicksburg will continue to be marketed as such, but the new expansion will permit at certain seasons of the year, if desirable, conversion of all ammonia production to solutions.

Completion of the company's Henderson, Ky., expansion is expected by July, 1955, at which time Spencer will be shipping ammoniating solutions from Henderson, Ky., Vicksburg, Miss. and Pittsburgh, Kans.

FOA Authorizations

India. $4,000,000—nitrogenous fertilizers. (Pio/C No. 86-13-052-5-50077). Ending delivery date—Feb. 29, 1956. Source—World wide. Procurement through Emergency Procurement Serv., GSA.

Indonesia. $991,211—agricultural pesticides. (PIO/C No. 97-51-006-5-50067). Source—USA & poss. Procurement through GSA.

$1,800—nitrogenous fertilizer. (PIO/C No. 97-12-028-5-50103). $1,600—phosphate fertilizer. (PIO/C No. 97-12-028-5-50104). $1,600—phosphate fertilizer. (PIO/C No. 97-12-028-5-50105). Source for all three PIO's 's USA & poss., Philippines and Japan. Ending delivery date—Dec., 1955. Procurement through Emergency Procurement Serv., GSA.

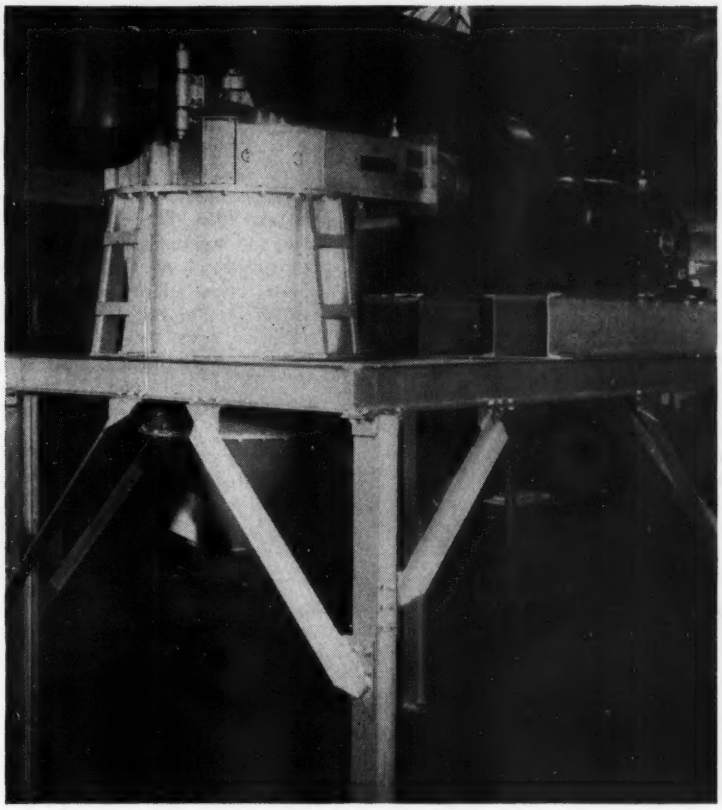
Iran. $326,797—agricultural pesticides. (PIO/C No. 65-51-015-5-50862). Ending delivery date—June 30, 1955. Source—USA & Poss. Procurement through GSA.

Pakistan. $39,565—potash ($900) and phosphates and other fertilizer materials ($38,665). PIO/C No. 91-13-010-9-31658). Ending delivery date—Dec., 1955. Source—World wide. Procurement through the Ministry of Industries Dept. of Supply and Development.

PIO-project implementation order.

NEW TYPE STURTEVANT AIR SEPARATOR

Recovers Fines in Micron Ranges



Now the famous Sturtevant Whirlwind Air Separator, so widely used throughout industry for fast recovery of fines, has been specially designed to "pick-off" classified materials such as pigments, limestone fillers, plastics, oyster shells, etc., in micron sizes.

These highly efficient air separators select a continuously uniform product of desired fineness. Used in a closed circuit with grinding mills, they increase production, cut power costs.

Large feed opening, rugged construction, ease of adjustment, low power consumption assure economy of operation and minimum upkeep. Write for further information.

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CRUSHERS • GRINDERS • SEPARATORS
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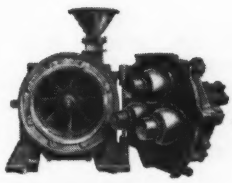
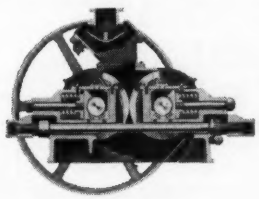
OTHER STURTEVANT EQUIPMENT

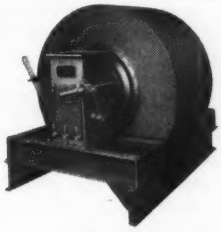
MICRONIZER GRINDING MACHINE
A fluid jet grinding machine, the Sturtevant Micronizer speeds reduction of materials to low micron sizes. These jet mills are especially applicable in fields where a particle size in microns is desired.
Sturtevant Micronizer grinding machines are available in many sizes and capacities.



RING-ROLL MILLS
For medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes. No scrapers, plows, pushers, or shields.



CRUSHING ROLLS
For granulation, coarse or fine, hard or soft materials. Automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8 x 5 to 38 x 20. The standard for abrasives.



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Four-way mixing action assures a thoroughly blended product. Open-door accessibility permits easy cleaning. Available in many mixing capacities for ¼-ton per hour and up.

Weed Society of America

Initial meeting of Weed Society of America is scheduled for Jan. 4-6, 1956, at New York's hotel New Yorker. Membership is open to all those interested in objectives of the group—$6.00 for active membership, $100.00 for sustaining.

The society was founded at Fargo, N. D., on Dec. 8, 1954, growing from action of the Association of Regional Weed Control Conferences.

Stated object of the society is "to encourage and promote the development of knowledge concerning weeds and their control through publishing research findings, fostering high standards of education, encouraging effective regulation and promoting unity in all phases of weed work. The society is dedicated to cooperate closely with regional weed control conferences in these endeavors."

WSA reports that membership is open to individuals and organizations interested in its objectives from all nations. Membership dues are $6 for 1955, which includes a subscription to the journal, WEEDS, to be the official publication of the society. Dr. K. P. Buchholtz, Dept. of Agronomy, University of Wisconsin, is editor, and Dr. W. C. Jacob, University of Illinois, Illinois Agricultural Experiment Station, Urbana, was named business manager of WEEDS.

All persons joining the WSA during calendar 1955 will become charter members, and a permanent constitution will be considered at the 1956 meeting. Those interested in membership may contact Dr. Jacob for an application.

Officers of and delegates to the Association of Regional Weed Control Conferences are to serve as the Executive committee of the society until the election of officers by WSA at the business meeting in New York. Officers reappointed to serve during the organizational period are R. H. Beatty, president; W. B. Ennis, Jr., vice president and W. C. Shaw, secretary-treasurer.

Aldrin for Soil Pests Approved in Iowa

Aldrin has not been dropped from the state's list of recommended insecticides for control of rootworms and other insects reports Iowa State College. False rumors have been circulated regarding the position of aldrin but it is recommended as a soil insecticide in 1955 along with dieldrin, heptachlor, gamma BHC and chlordane.

Plan Sanitation Courses

One day sanitation short courses will be offered in a group of representative cities during the coming year according to Dr. Edward L. Holmes, executive director, American Sanitation Institute, a division of The Hugé co., St. Louis, Mo. The clinic will emphasize practical methods of developing and maintaining successful food plant sanitation programs and will include demonstrations on utilization of latest techniques.

GSA Pyrethrum Disposal

Notices that it plans to dispose of about 60,000 pounds of pyrethrum (20 per cent) extract on and after Nov. 1 have been issued by the General Services Administration.

In the notices, the agency stated that the material is "obsolescent for use in time of war because of the development of new and better materials." The agency intends to channel the pyrethrum to processors of that material at current market prices over a period of a year.

N Plant for Puerto Rico

Gonzales Chemical Ind. will erect a nitrogen plant with deepwater facilities on the bay at Guanica, Puerto Rico.

Financing plans have been completed for the construction of a $12,250,000 anhydrous ammonia plant and other integrated facilities in Puerto Rico, Luis R. Gonzales, president of Gonzales Chemical Industries, Inc., has announced.

The plant site will have deep-water facilities on the bay at Guanica on Puerto Rico's south coast. The plant is designed to produce 42,000 tons per year, part of which will be sold as such, and the balance converted to aqua ammonia, sulfate of ammonia and possibly other products for agriculture and industry.

Lummus co. is designing and will construct the plant. Cox & Weinrich are consulting engineers for Gonzales.

ACP Sues Thompson

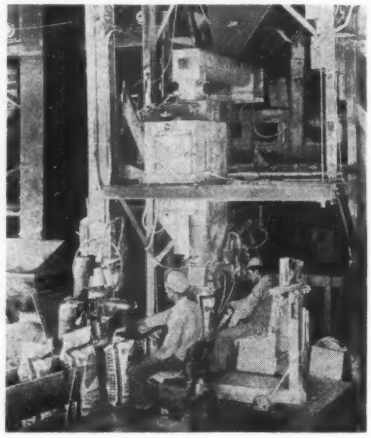
Suit for the infringement of US Patent No. 2,258,292 has been filed by American Chemical Paint co. against Thompson Chemical corp. in the US District Court for the Southern District of California.

The product which American Chemical Paint asserts infringes upon the patent is sold by Thompson under the trademark Ana Amide.

Knoxville Ups Bag Rate with New Units

A record has been established at Knoxville Fertilizer co. for bagging fertilizer, reports Richardson Scale co. With a new installation at the Knoxville plant, two men can bag with acceptable accuracies, up to 16½ units per minute, an increase in rates up to 100 per cent.

Handling a fast-dissolving pulverized fertilizer, Knoxville had been gravity-feeding the product, sacking in valve



bags. However, it was difficult to increase speed without impairing accuracy because of the flushy nature of the product.

When called on to revamp the weighing system, Richardson Scale installed a 9" single-screw feeder overhead, replacing the gravity-feed system, and a standard Richardson E-50 automatic scale.

Now Knoxville is bagging 15 100 pound bags per minute of its lightest fertilizer and 16½ 100 pound bags per minute of a slightly heavier product.

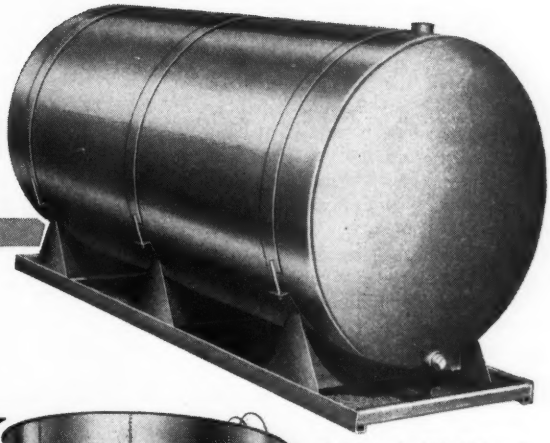
FTC Petitions

Shell Chemical corp. has filed petitions for establishment of residue tolerances for aldrin and dieldrin on certain raw fruits and vegetables.

A tolerance of one part per million for each of the pesticides used on a selective list of products was proposed in the petitions.

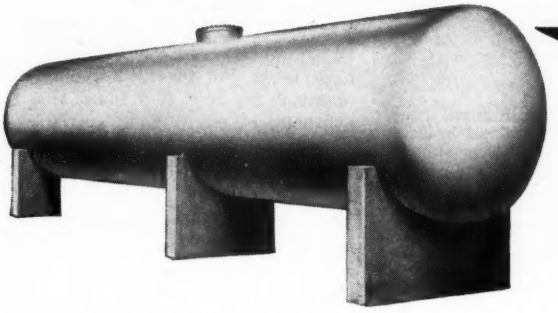
Chemagro corp. has requested a residue tolerance of .75 parts per million for Systox (b-ethylmercaptoethyl di-ethylthionophosphate) on certain specified agricultural commodities.

For farm storage...

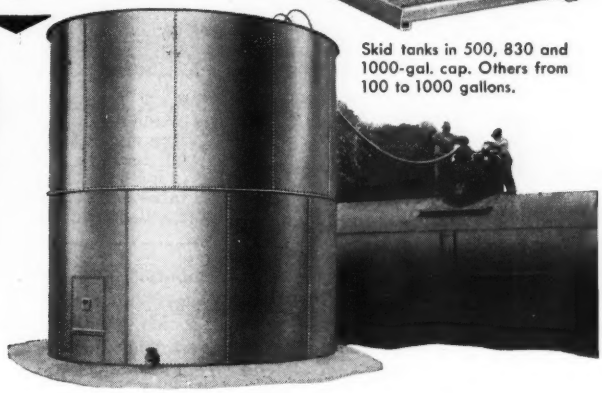


Skid tanks in 500, 830 and 1000-gal. cap. Others from 100 to 1000 gallons.

For bulk storage....



Welded low-pressure tank for bulk storage. In 12,000 and 22,000-gallon capacities.



Bolted 22,000-gallon non-pressure tank for bulk storage.

Profit with BUTLER aluminum tanks for liquid nitrogen solutions

Cash in on the amazing upsurge in use of liquid nitrogen fertilizers. Butler now offers you two new types of special alloy non-corrosive aluminum bulk storage tanks for liquid nitrogen solutions.

One is a bolted vertical 22,000-gallon tank for non-pressure solutions. The welded tank—in 12,000 and 22,000-gallon capacities—is a horizontal bulk storage tank for low-pressure solutions, available to code specifications.

Smaller size horizontal aluminum tanks in 100, 270, 500, 830 and 1000-gallon capacities are also available. The 500, 830 and 1000-gallon tanks can be equipped with skids for on-farm storage or transporting solutions from bulk station to farm.

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Sohio Work Ahead of Schedule

Products of the $17 million petrochemical plant of Standard Oil co. (Ohio), now under construction at Lima, O., will be marketed by the Sohio Chemical co., a newly formed subsidiary, according to Clyde T. Foster, president of the parent company.

Sohio Chemical co. president, Edward F. Morrill, reports that rapid progress on the Lima plant indicates it will be completed on or ahead of schedule in early November. The plant will manufacture anhydrous ammonia, urea, nitric acid and nitrogen solutions, and first shipment of products is expected on Jan. 1.

Home offices of the new company will be at Lima. Clifford D. Shields has been named assistant secretary and assistant treasurer.

E. F. Morrill, Sohio Chemical co. president, breaks ground with the company's $40 million "silver shovel" used in ground breaking ceremonies for other Sohio units of that value in recent years. At left is H. H. Tucker, and right, H. S. Coleman.

Ketona Plans Addition

Ketona Chemical corp. plans to build additional facilities for production of nitrogen solutions at its plant site near Tarrant, Ala., where an ammonia synthesis unit is presently being constructed.

A contract to design, engineer and construct the facilities for producing nitrogen solutions has been awarded to Fluor corp. Production of ammonia at the Ketona plant, which is jointly owned by Alabama By-Products corp. and Hercules Powder co., is expected to begin in late fall, with solutions production following in early 1956.

Start St. Paul N Plant

Construction of St. Paul Ammonia Products' plant at Pine Bend, Minn., was to begin by press time.

The plant is expected to produce 200 tons of ammonia per day for use in industrial chemicals and fertilizers.

Expands Custom Service

Arthur Schumacher has purchased the former municipal power plant near Columbus Grove, O., for expansion of his Schumacher Soil Service. He has announced plans to custom-blend NPK, according to soil test.

Tenth Anniversary for MRI

Midwest Research Institute, celebrating its 10th anniversary, opened its new, modern research center at Kansas City, Mo., on May 9. Several hundred Midwestern business firms and industrial leaders contributed the $1,250,000 necessary for construction of the three-level laboratory which houses over 230 trained technicians.

Formed by a group of Kansas City residents, interested in furthering development of the Midwest, the Institute has four operating divisions, and handles a wide variety of projects with activities extending beyond the six-state area it was designed to serve.

New Huber Corp., Book on Kaolin

A second edition of "Kaolin Clays and Their Industrial Uses" has been issued by J. M. Huber corp. The hard-bound volume of 214 pages contains a wealth of information on composition of clays, production and processing and their application in various industries.

One chapter is devoted to the use of Huber clays in pesticides. Various formulation properties are reviewed along with the effects of clays and other diluents.

Pesticide producers interested in the volume should write directly to the J. M. Huber corp., 100 Park Ave, New York City 17.

NH_3 Releases PK, Increases Soil pH

Missouri workers find NH_3 makes available substantial quantities of other plant food elements, does increase soil pH.

Measurements made by Dr. George E. Smith of the Soils dept. and Frank A. Stanley, a graduate student, are reported in an article, "Proper Application Improves Value of NH_3," in the April-June issue of AGRICULTURAL AMMONIA NEWS.

The Missouri soil scientists made their tests in silt loam soil, comparable to that in many other farming regions.

In using 100 pounds of anhydrous ammonia per acre, they found that the synthetic nitrogen made available 47 pounds of additional phosphate and more than four pounds of additional potash. Although already in the soil, this phosphate and potash were in a form not yet available to growing plants.

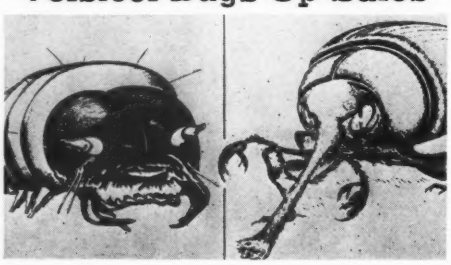
Dr. Smith and Stanley also added prooof to a thesis already accepted that ammonia upon application increases the pH in soil. In some areas, farmers have the mistaken idea that ammonia increases soil acidity.

Because ammonia gas appears to diffuse in the soil under average conditions to about four inches in all directions from point of application, they said it would appear that preplant and off-season applications should be practiced where possible, using closer spacings than the standard 40-inch row width.

The scientists also found that ammonia losses were extremely low when applications were made in soil at optimum 15-18 per cent moisture content. The loss was only 1 per cent in 36 hours, even though applied only 3 inches deep.

They also concluded that dry soils hold ammonia far better than extremely wet soils. This accounts for particularly good results farmers in the corn and cotton growing regions have experienced in side-dressing ammonia, and those of wheat farmers with pre-plant summer and fall applications.

Velsicol Bugs Up Sales



The use of dramatized insects in current advertising has resulted in a "very substantial increase" in Heptachlor sales, according to L. E. Carls, Velsicol corp. advertising mgr. The corn rootworm (on the left) and the alfalfa weevil (on the right) are currently being used in western, midwestern and eastern campaigns. Both insects were drawn by use of low-power microscopes and then embellished to get a more animated effect.

your eye tells you why

International's New Triple Superphosphate Means

better granulation

YOUR first glance tells you why the fine, virtually dust-free texture of International's new Triple Superphosphate gives such improved results. It promotes better granulation in your high analysis plant foods — improves product acceptance. It assures thorough and more complete ammoniation; reduces the need to grind before mixing; cuts mixing costs. Proper conditioning before shipment also reduces the problem of setting up en route, for easier, more economical handling — plus high product performance.

International's new Triple Super offers these extra benefits because it's produced by a new process from high quality rock. Result: a high analysis product (46% A.P.A. or better) with the right particle size and correct chemicals structure for best results in making modern plant foods. International's expanded facilities assure a reliable supply of this improved Triple Superphosphate, now available for immediate delivery to your plant. Write or wire the Phosphate Chemicals Division for samples and quotations.

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NCI Begins Second Contact Acid Plant

Leonard Construction will erect a second Monsanto type contact acid plant at Northern Chemicals Industries, Searsport, Me. It is to be finished prior to completion date for nitrogen plant.

J. E. Totman, president, stated the plant will have a rated capacity of 100 tons per day of 100 per cent sulfuric acid, which, combined with its present plant, will give NCI a total rated daily capacity of 170 tons, with actual up to 220 tons. Tank storage will be increased to 4,000 tons.

The plant, reflecting Leonard's latest design, will adjoin the present unit built in 1943 at Kidders Point, Searsport, Me. Completion is scheduled for Jan. 1, 1956, preceding by about 60 days, NCI's completion date for its 125 ton per day anhydrous ammonia and nitric acid facilities now being constructed by Girdler co.

Cost of the new acid facilities will increase the company's investment in its chemical center at Searsport by some $650,000 bringing to a total of $10 million the company will invest in new facilities during the 1955-56 period.

Garden Foundation, Inc.

Establishment of Garden Foundation, Inc., an organization to serve the garden supply industry and its customers through national market research, consumer education and merchandising program, has been announced by D. Murray Franklin, publisher of GARDEN SUPPLY MERCHANDISER magazine.

Canadian Fert. Plant

Completion of Sani-Pulp corp.'s plant in LaSalle, Que., Canada, for production of fertilizer, soil conditioners, unbleached sulfate and bleached or unbleached sulfite pulp from refuse, is expected by July 1.

OVERSEAS

Argentina. A DDT plant constructed by Atanor with the aid of J. R. Geigy, Switzerland, is now operating in Rio Tercero. It has a capacity of 2.2 million pounds DDT yearly and there are facilities for production of monochlorobenzene and chloral.

Belgium. The current expansion program of Societe Belge de l'Azote et des Produits Chimiques du Marly is expected to increase its fertilizer production by a third in under two years, will permit costs to be lowered and is expected to increase the company's world competitive position. It plans to export 60 per cent of output.

Colombia. Another Department of Commerce survey shows that pesticide consumption, which has been rising steadily, is expected to double by 1960, according to the Caja de Credito Agrario, the principal consumer. The country depends on imported products, for lime is the only available domestic material.

The US is the principal source of pesticides and should continue to compete successfully with European countries if prices remain comparable. Materials are distributed mainly through branches and agents of the Caja or by the Public Health Service. Household pest controls are sold mostly through drugstores.

Two firms compound and package insecticides, and the report states that eventually copper sulfate may be produced in Colombia and household insecticides formulated from imported toxicants and domestic oil.

Netherlands. Expansion of nitrogen Fertilizer facilities is planned by MEKOG, Ijmuiden. Present output of 370,000 tons of fertilizers will be increased with about 500,000 tons within a few years.

The new factory will use crude oil as a basic material and will take two years to build.

South Africa. This country may soon be independent of outside rock phosphate sources. Open cast mining has begun and it is estimated that the apatite deposit will supply total domestic demand for some 150 years. Phosphate Development corp. opened the mine and plans to supply superphosphates.

Venezuela. Hrant Adjemian is the man sponsoring plans to build five plants for conversion of household refuse into organic fertilizer. He recently visited the Inter-American conference in New Orleans where his project aroused considerable interest, and reports that a group of potential investors will soon visit Caracas for negotiations. Local industrialists and businessmen are already forming a company.

Eight plants using the "zymothermic" process are already in operation, the first of which was built in France in 1926.

The Venezuelan importer added that he had been asked about the possibility of such installations in the US, particularly where bagasse is currently discarded. This material, he said, would be very suitable for conversion into humus.

A price of close to $30.00 a ton is planned for the Venezuelan material, a figure which is expected to yield a net of 30-35 per cent.

People

The Virginia State Chamber of Commerce has elected Frank A. Ernst, manager of **Allied Chemical & Dye corp.'s** Hopewell plant, its president.

American Mineral Spirits co. appointments: James V. McLaughlin named assistant to the president, Edward M. Toby, Jr.; Richard V. Hinman, assistant eastern sales manager; Karl F. Giloth, midwest sales manager.

American Potash & Chemical corp.'s technical director, George T. Deck, has been named plant manager of **American Lithium Chemicals** new San Antonio plant.

Groth-Marnat

Brea Chemicals, Inc. has named Rudolph Groth-Marnat manager of export sales. Formerly Southern California manager of the Import-Export div. of Grace and co., he will be responsible for development of export markets for Brea's agricultural and industrial ammonia products as well as new chemical products developed by Brea's Research dept.

Kline

Dr. Charles H Kline has been appointed manager of the newly created Chemical Development div. of **Climax Molybdenum co.**

Special sections of the new division will focus attention on the use of molybdenum in catalysts, colors, lubricants

and as trace elements in fertilizers.

The company also announced appointment of Lars E. Ekholm as manager of its Sales div.

Columbia-Southern Chemical corp. has appointed C. T. Robertson to the newly-created position of assistant district sales manager of its New York City district office.

Watts

C. J. Watts, Jr. has joined the Agricultural Chemical Sales dept. of **Commercial Solvents corp.** and will handle the sale and distribution of CSC ammonium nitrate to the fertilizer trade in the Southeastern states. A graduate of Tennessee Wesleyan College, he was formerly with Davison Chemical co.

Appointment of Charles M. Hickey, Sam S. Emison and Jennings C. Crowder as vice presidents of **Consolidated Chemical Industries Inc.** was recently announced by George L. Bond, CCI president.

Hickey

Hickey has been with the firm since 1924, and will continue as manager of manufacturing, Southern div., Houston, Tex.

Emison

Emison, who has been associated with Consolidated Chemical since 1925, will remain as sales manager, Southern div., Houston, Tex. Formerly general superintendent, Southern div., Crowder will move to San Francisco and take over the newly created position as general manager, New England and Pacific divisions. He has been with the company since 1927.

Crowder

Died: J. Walter Cooper, Sr., 73, on May 1 in Atlanta. Before his retirement in 1947, he was manager of the Chemical Fertilizer div. of Swift & co.

Promotion of Dr. William J. Lightfoot to chief staff engineer in the Central Engineering dept. has been announced by **Diamond Alkali co.**

Robert J. Koll has been appointed plant manager of **Diamond Alkali co.'s** Greens Bayou plant at Houston, Tex., replacing Henry S. Curtis, who has resigned. Prior to joining Diamond in 1945, he had been associated as a development engineer with Rohm & Haas co. and B. F. Goodrich Chemical co.

Appointment of Wayne D. Wegrich as manager of the Waco, Tex., plant of **Diamond Black Leaf co.** has been announced by George V. Dupont, manager of manufacturing.

Wegrich

From 1952 to 1954 he was connected with Virginia-Carolina Chemical co. in various supervisory capacities at its Waco and Richmond plants.

Eastern States Farmers Exchange has formed two new divisions—Purchasing and Production, with W. H. Prigmore as director, and Research, with Dr. Joseph A. Chucka as head.

S. A. Swensrud, chairman of Gulf Oil corp., has been elected a director of **Goodrich-Gulf Chemicals, Inc.,** succeeding W. G. Moore, and also has been named chairman of the board. P. W. Cornell, a company director since 1953, was elected vice president in charge of operations, engineering and development, and J. E. Miller, has been named general sales manager of Goodrich-Gulf.

The board of directors of **W. R. Grace & co.** has named Charles E. Wilson as chairman of the board, succeeding William Grace Holloway who announced his retirement recently at the company's annual stockholders' meeting. The board has named Holloway honorary chairman.

Williams, former president of General Electric co., has been serving as chairman of W. R. Grace's Executive committee.

Appointment of Robert W. Crabtree to the newly-created position of manager, nitrogen products sales, is announced by J. M. Martin, general manager of **Hercules Powder co.'s** Explosives dept. Crabtree, who will headquarter in Wilmington, is succeeded as sales manager for nitrogen products in San Francisco by R. E. Segerdell.

New manager of the Chemical section of **Johns-Manville's** Special Industries dept. is Charles B. Hann. He will headquarter in the company's general offices in New York City.

Chas. H. Lilly co. has named Darcy M. Sater manager of its Seed div. For 15 years, Sater has been with Lilly co. in its seed operations and as manager of its Craigmont, Ida., and Yakima, Wash., branches.

Dr. Ralph N. Lulek, former vice president in charge of manufacturing and research for Grace Chemical co., has announced that he will become a chemical and management consultant. He will continue as a director on the Grace Chemical board and as a consultant to the company.

Claude E. Hobbs, Jr., has joined the **Manufacturing Chemists' Association** as staff counsel.

At the annual stockholders' meeting of **Michigan Chemical corp.** nine directors were re-elected and a tenth director, W. J. Mitchell, president of Mitco corp. was elected to the board.

Powell

Richard G. Powell has been named technical service representative by **Mississippi River Chemical co.** He will assist Bradley & Baker, distributors of the agricultural products produced by Mississippi River Chemical, marketing products to fertilizer manufacturers.

For the past three and one-half years, Powell has been with Spencer Chemical co., doing technical service work in the nitrogen field.

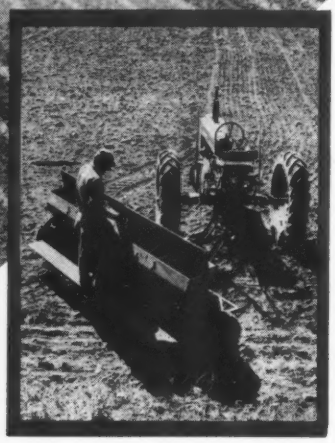
Victor E. Wardlow has been named manager of the new bulk fertilizer mixing plant under construction at Lockwood, Mo., by the **Missouri Farmers Association.**

Monsanto Chemical co.'s Industrial Chemicals div. has announced several changes in its sales organization: J. R. Harrington has been named assistant district manager of the Chicago territory. He is succeeded as Cincinnati district manager by Lester D. Hatch, formerly in the St. Louis office. R. H. Baugh, product group sales manager for specialty phosphate, will take over items formerly handled by Hatch.

Ralph E. Schroeder succeeds Frederick H. Gibson as purchasing agent for the Trenton, Mich., plant of **Monsanto's** Inorganic Chemicals div.

Two **Monsanto** vice presidents, John L. Gillis and Edward A. O'Neal, Jr., have been elected to the company's board of directors.

Nitrogen div., Allied Chemical & Dye corp., has appointed Ralston G.



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JAEGER LOAD-PLUS *auto-scoop*

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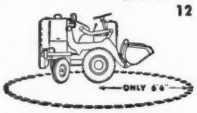

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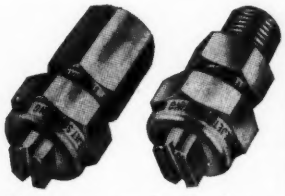

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Samples, specifications and detailed information available upon request.

TENNESSEE TC CORPORATION

TENNESSEE CORPORATION

617-629 Grant Building, Atlanta, Georgia

Hurlbutt as western sales manager. He will make his headquarters at 1095 Market St., San Francisco 3, Calif.

Verdery

A. B. Verdery has been appointed eastern district sales manager of **Olin Mathieson Chemical corp.'s** Eastern Fertilizer div., with headquarters in Baltimore. A graduate of Clemson College, Verdery was, from 1950 to 1953, president of his own company, the Augusta Fertilizer co., Augusta, Ga.

Election of Howard Barkell to its board of directors and Charles H. Winship, Jr., to vice president has been announced by **Phelps Dodge Refining corp.** Barkell is a vice president of the firm and Winship is sales manager of both Phelps Dodge corp. and Phelps Dodge Refining corp.

Creasy

Rudy Creasy and Irwin C. Elliott have been named sales representatives for the Agricultural Chemicals div., **Pittsburgh Coke & Chemical co.**

Creasy, who will serve out of the company's St. Louis office, is a graduate of the University of Missouri. Prior to his appointment he was associated with the Plant Food div. of Missouri Farmers Association.

Elliott

Elliott, a graduate of Colorado A&M will headquarter at the company's Denver office. Prior to his appointment, he was a partner and manager of Pueblo Chemical co. and assistant state supervisor of agricultural education of Colorado.

Stringfellow

Mark B. Stringfellow has been named manager of market development, a newly-created marketing position, at **Spencer Chemical co.** He goes to Spencer from Nopco Chemical co., where he was manager of the Plastics div. Previously he was with Carbide and Carbon Chemical co., engaged in development and engineering work.

Stauffer Chemical co. has appointed Wyman L. Taylor, San Francisco district sales manager of industrial chemicals, replacing R. N. Nason, who has resigned.

Murphy

Stauffer Chemical co. has named Dr. Douglas R. Murphy research and technical advisor for the Midwest region, according to an announcement by Dan J. Keating, director of Sales, Agricultural Chemicals div. Dr. Murphy, a Ph.D. from Iowa State College, will make his headquarters in the company's Chicago office.

Texas co. has named L. C. Kemp, Jr., general manager of its Petrochemical dept., with headquarters in New York. After joining Texaco in 1929 as a research chemical engineer, he served in various managerial capacities in the research field, and served as director of research from 1941 to 1953.

Dr. Augustus B. Kinzel has been elected vice president—research **Union Carbide and Carbon corp.,** succeeding Dr. George O. Curme, Jr., who will continue as a director.

In late April, Dr. E. L. Griffin, retiring assistant head of the Pesticide Regulation Section, Plant Pest Control Branch, ARS, USDA, was honored by the National Agricultural Chemicals Association and other representatives of the pesticide industry.

Victor Chemical Works has elected Raymond L. Geiler vice president—California operations.

Company Briefs

Albert Frank-Guenther Law, Inc. has been appointed agency for **Allied Chemical & Dye corp.'s** institutional advertising program.

All of **American Cyanamid co.'s** Cincinnati, O., offices and warehouse facilities are being consolidated into a new building at 2350 Glendale-Milford Road, Evendale, O., a suburb of Cincinnati.

American Mineral Spirits co. has completed its new distributing plant at Oakland, Calif. Located at 401 High St., Amsco's new million gallon terminal is the most modern distributing plant of its kind, reports M. A. Williams, president.

Sales of **American Potash and Chemical corp.** in the first quarter of 1955 were $6,751,000, compared with $5,923,000 for the same three months of 1954. After all charges, net income amounted to $836,634, an increase of $304,689 over the $531,945 of last year.

Atlas Powder co.'s net earnings after taxes for the first quarter of 1955 were $741,833, or 13 per cent above the $657,533 earned in the same period last year. Sales and operating revenues for the first three months of 1955 totaled $14,714,045, or 2 per cent above the 1954 period $14,481,114.

Commercial Solvents corp.'s Animal Nutrition dept. has published a booklet on high-level feeding, which explains how Penline-200 works to fight secondary invaders, stimulate appetites and hasten recovery of sick birds at an economical price. Copies are available from the Animal Nutrition dept., Commercial Solvents corp., 260 Madison Ave., New York City 16.

Plans for participating in Northwest Nitro-Chemicals, Ltd. have been announced by **Commercial Solvents corp.** CSC plans to operate the Canadian firm, which is located in southern Alberta, under a long-term management contract. Initial operation is scheduled for early 1957.

First quarter reports for **Commercial Solvents corp.** show consolidated net earnings of $814,186, equal to $.31 per share on 2,636,878 shares of common stock. Sales for the quarter were $12,946,209, an increase over the $11,989,382 reported for the first three months of 1954.

Revenues of **Diamond Alkali co.** and its subsidiaries for the first three months of 1955 totalled $24,533,732, compared with $22,223,042 for the same period last year. Net income also showed an increase, to $1,632,905 against $1,365,116 for the first quarter of 1954.

April began **Dicalite's** 25th anniversary year, according to an announcement by D. Loring Marlett, vice president and general manager of the Dicalite div., Great Lakes Carbon corp. During the 25 years of operation, more than 50 million bags of diatomite products have been produced and shipped to industrial users all over the world. Besides its use as a conditioning agent for chemical fertilizers, Diatomite is used in filtering hundreds of different liquids and in paint, paper and insulation.

Operations at **Geigy Agricultural Chemicals'** Aberdeen, N. C., plant, which had been halted since last November, were to be resumed in mid-May, according to a recent announcement.

Berkshire

. . . . . specialists in magnesia for agriculture

EMJEO (80/82% Magnesium Sulphate)
Calcined Brucite (fertilizer grade) 70% MgO
Calcined Magnesite 85 to 95% MgO

POTNIT
(95% Nitrate of Potash)
for
Special Mixtures and Soluble Fertilizers
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INSECTICIDES—FUNGICIDES
Mercury Compounds
for Agricultural Use

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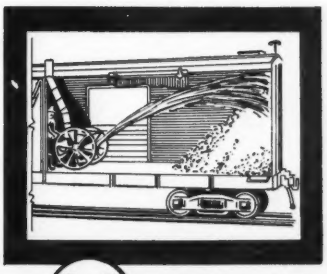
LOAD AND TRIM BOX CARS *FASTER, CHEAPER..* with **S-A BOX CAR LOADERS**



S-A Loaders and Pilers will SAVE YOU MONEY with every car you load. One man, working part-time can load and trim up to 150 tons per hour of granular material up to 2" lump size.

PRICED AS LOW AS **$7620.00** F.O.B. AURORA

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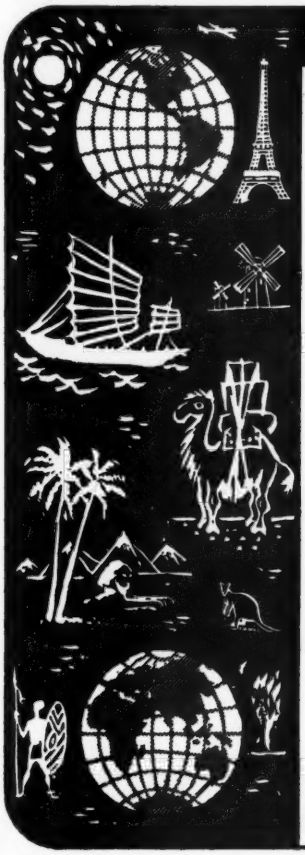

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Woodward & Dickerson Inc. serves you
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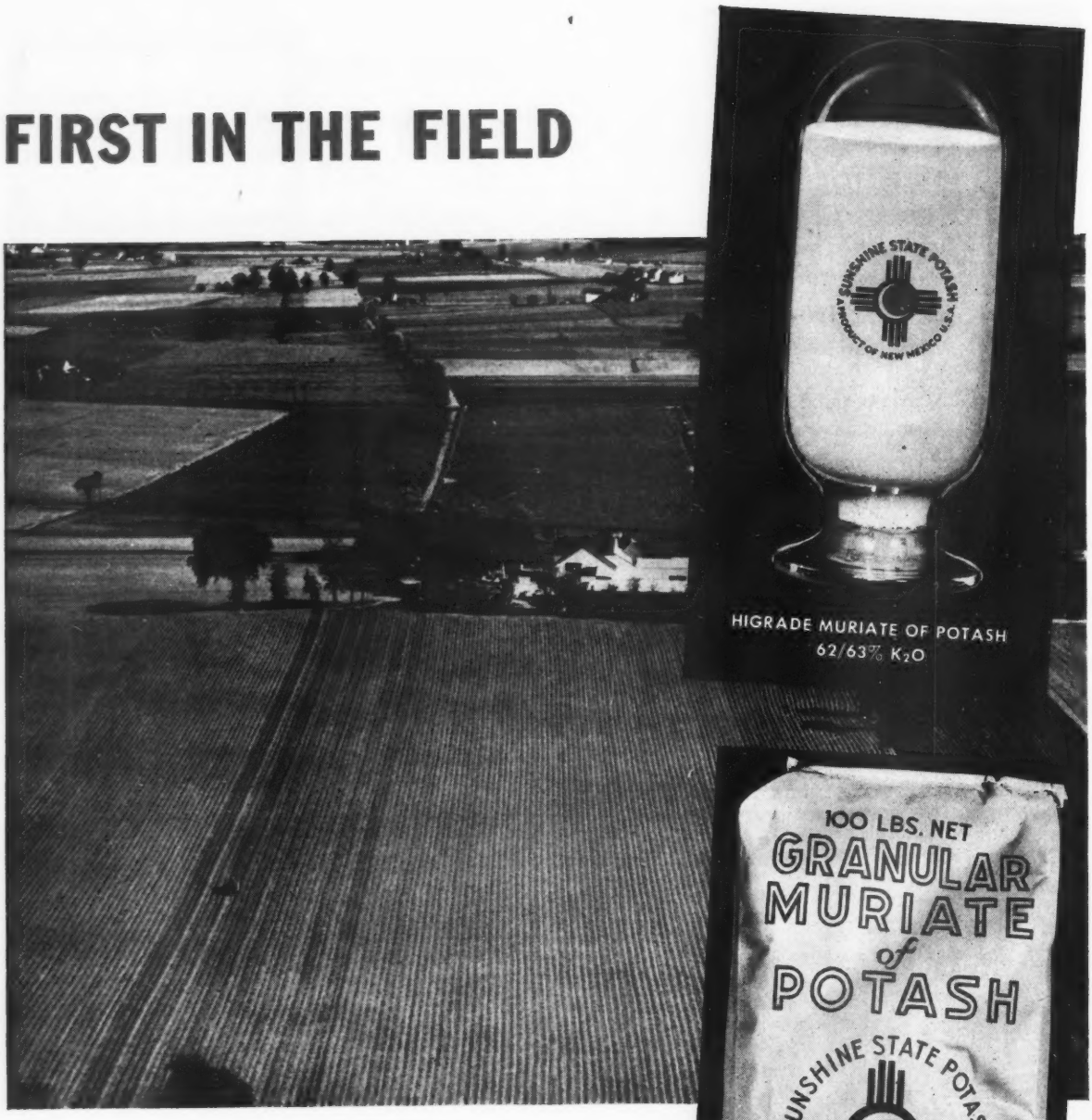

As the first producer of potash in New Mexico, the United States Potash Company is proud of the preference that the fertilizer trade has shown for its two products—

1. Higrade muriate of potash (62/63% K_2O)—tops in the trade for production of the new high analysis fertilizers.
2. Granular muriate of potash (60% K_2O min.)—tops in preference for certain types of fertilizers and for direct application.

These two fine products deliver better results—conclusive evidence that they are "first in the field."

UNITED STATES POTASH COMPANY

INCORPORATED

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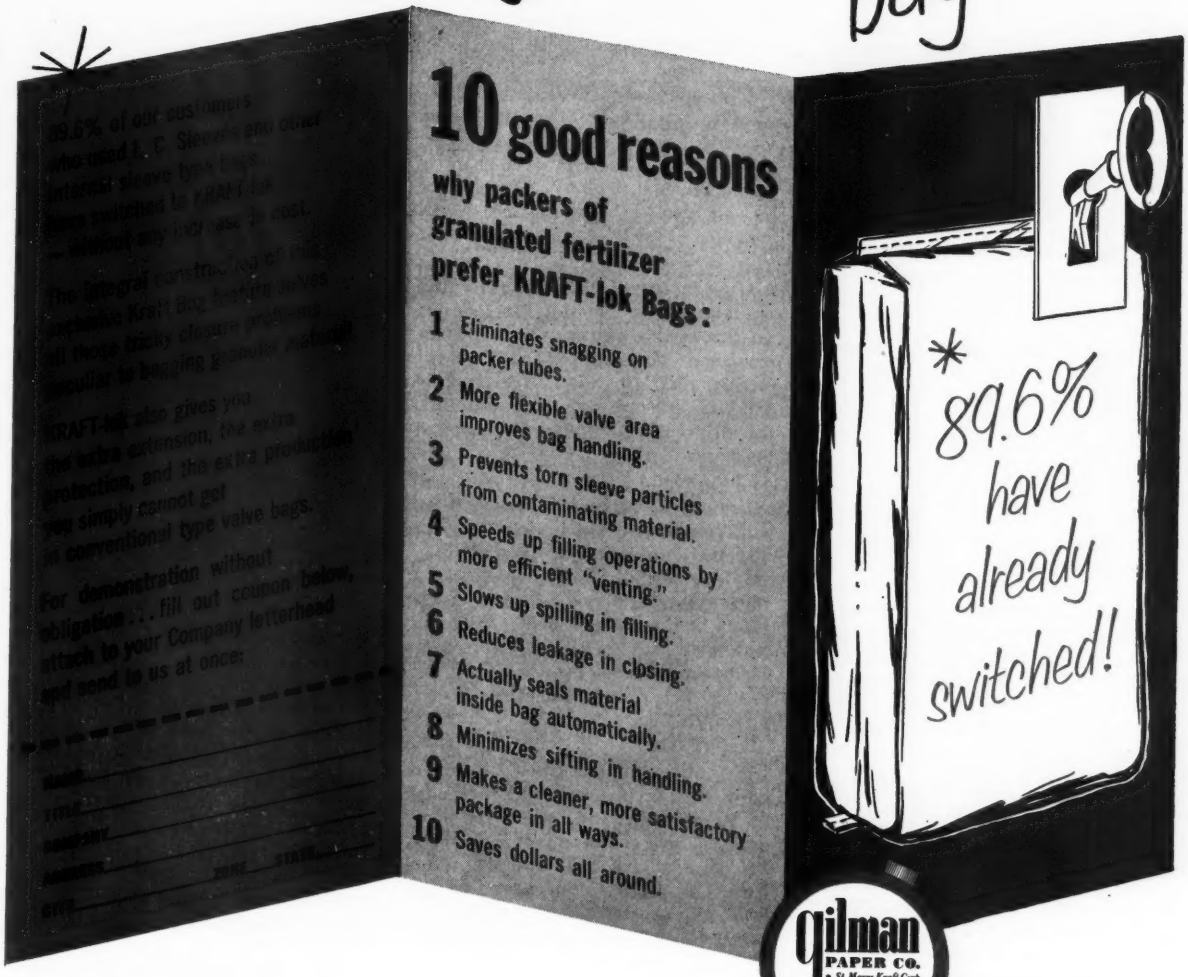
Southern Sales Office Rhodes-Haverty Building, Atlanta, Georgia

GOING GRANULAR?

switch to KRAFT-lok® bags!


89.6% of our customers who used L. C. Sleeves and other internal sleeve type bags have switched to KRAFT-lok
The integral construction of the exclusive Kraft Bag feature solves all those sticky closure problems peculiar to bagging granular materials.
KRAFT-lok also gives you the extra extension, the extra protection, and the extra production you simply cannot get in conventional type valve bags.
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10 good reasons
why packers of granulated fertilizer prefer KRAFT-lok Bags:
1 Eliminates snagging on packer tubes.
2 More flexible valve area improves bag handling.
3 Prevents torn sleeve particles from contaminating material.
4 Speeds up filling operations by more efficient "venting."
5 Slows up spilling in filling.
6 Reduces leakage in closing.
7 Actually seals material inside bag automatically.
8 Minimizes sifting in handling.
9 Makes a cleaner, more satisfactory package in all ways.
10 Saves dollars all around.
* 89.6% have already switched!

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y. • Daily News Bldg., Chicago 6, Ill.

Gilman PAPER CO.
- St. Marys Kraft Corp.
- Gummed Tape Div.
- The Cellucord Corp.
- Kraft Bag Corp.

1 Responsibility
2 Integrated Plants
3 Generations of Bag Experience

Exceeding the 400 million dollar mark for the first time, sales and operating revenues of **W. R. Grace & co.** reached $413,401,905 during 1954, as compared with $330,979,665 in 1953, according to the company's annual report to the stockholders. Net income totaled $14,794,326, compared to $12,585,688 for the previous year, an increase of 17.5 per cent.

The company stated that its Davison division showed improved earnings over 1953, and that Grace Chemical co.'s pre-operating and development expenses of more than $2,000,000 were absorbed in 1954's consolidated net income.

Construction of pipelines to neighboring plants of DuPont co. and Cardox corp. was started during the year. The pipelines will deliver nitrogen, hydrogen and carbon dioxide under long-term sales contracts.

A new division, the **Grace Chemical Research and Development co. div.,** with William P. Gage, president and Elwyn E. Winne, vice president has been established to spearhead W. R. Grace & co.'s anticipated further expansion in the chemical manufacturing and processing fields, J. Peter Grace, W. R. Grace president, has announced

Gage

Headquarters of the new division will be in New York.

Concurrently, it was announced that main offices of Grace Chemical co., now in New York, are being transferred to Memphis, Tenn., where William J. Haude will be in charge as vice president and general manager. John G. Carriere, presently plant manager of the company's ammonia-urea plant located near Memphis, has been named vice president and plant manager.

A state charter has been granted to **Green Belt Chemical co.,** Cincinnati, O., to manufacture and sell chemical fertilizers. The firm, with $200,000 capital, has as its incorporators Charles W. Croger, N. E. Miller and Walter R. White.

Net income of **Lion Oil co.** for the first quarter of 1955 was $5,247,157, or $1.70 per share of stock outstanding. This represents an increase of 51 per cent over the similar figures for the same quarter of 1954 which were $3,468,610, or $1.12 per share.

Sales and operating revenues for the period were $30,499,164 compared to $26,385,357 for the 1954 period.

A fire is reported to have caused $60,000 damage at offices of **Liquillizer corp.'s** liquid fertilizer plant south of Vincennes, Ind.

Michigan Chemical corp. reported a net income of $33,200 for the first three months ended March 31, 1955, compared with a loss of $209,100 before tax carry-back of $43,400 in the similar quarter of 1954.

Sales were $1,588,628 for the first quarter of 1955 against $948,825 in the 1954 period.

Naugatuck Chemical div. of Dominion Rubber co., Ltd., has been appointed sales and technical representative in Canada for Rhodia, Inc. It will sell and service Rhodia's "Alamask" industrial reodorants and its aromatic chemicals.

Domestic and Canadian sales of **Olin Mathieson Chemical corp.** for the first quarter of 1955 ended March 31 were $121,175,381—9.7 per cent above those of last year. Earnings from these sources were $8,007,911, compared with $7,581,976 in the same quarter of last year, the company reported.

Blockson Chemical co., of Joliet, Ill., will be taken over by **Olin Mathieson Chemical corp.,** according to a recent report. Three-quarters of a share of Olin Mathieson stock will be exchanged for one share of Blockson, the report states.

Gross income of **Phillips Petroleum co.** and its subsidiaries for the first quarter of this year was $212,256,017, compared with $198,525,493 for the same period last year. Net profit of $22,110,258 is 15 per cent higher than the $19,162,400 reported for the first quarter of 1954.

Sales by **Pittsburgh Plate Glass co.** and consolidated subsidiaries during the first quarter of this year were $139,733,132, as compared with sales of $98,126,720 for the same period last year, reports Harry B. Higgins, president. Net earnings were $16,026,948, equivalent to $1.73 per share of outstanding stock. For the 1954 quarter net earnings were $7,179,978.

Executive offices of **Shea Chemical corp.** have been moved from Baltimore to Jeffersonville, Ind., where the company has built permanent office quarters. An office at 114 East 40th St., New York City 16, has been opened by the firm and an Organic Phosphates div. has been established at Adams, Mass.

As of March 31, 1955, **Smith-Douglass co.** reported the same number of disabling accidents as had occurred at the end of March, 1954—five. The company's Tenoroc, Lakeland, Fla., team continued to lead its safety league, with no lost time accidents in 116,094 man hours.

About 15 acres of a tract of land at Omaha, Neb., recently purchased by **Stauffer Chemical co.** is expected to be used in 1955 for construction of a plant to manufacture dust and liquid insecticides, herbicides and grain fumigants.

Stauffer's earnings for the first quarter were $1,579,454, (67 cents per share) compared with 1954 figures of $1,124,279, (48 cents). First quarter 1955 net sales, at $22,146,779, were up 23 per cent.

At the annual meeting of stockholders of **Stauffer Chemical co.** all directors were re-elected for the coming year.

In commenting on the results of operations for the first quarter of 1955, Christian de Guigne, chairman, told the stockholders that sales and earnings were at the highest rate in the company's history.

Stauffer de Mexico, S.A., subsidiary of Stauffer Chemical co., has opened an administrative office for Eastern Mexico at Edificio La Nacional, Despacho 411, Monterrey, N.L. Mexico.

The company has announced construction of a new insecticide plant at Reynosa, Tamps., to replace the present, a smaller facility at Rio Bravo, Tamps.

Tennessee Products & Chemical corp. has moved its New York City offices from the Empire State Bldg. to 787 First Ave. Telephone Number: MUrray Hill 3-2900.

Moved: **The House of J. Hayden Twiss,** advertising agency, to new offices at 500 Fifth Ave., New York City. Telephone number: PEnnsylvania 6-8876.

All chemical operations of National Distillers Products corp. will be conducted by the firm's **U. S. Industrial Chemicals co.** div., according to a recent announcement. Officers of the division are Dr. Robert E. Hulse, general manager; W. P. Marsh, Jr., assistant general manager; L. A. Keane, director of sales; R. H. Cornwell, director of production; S. Scott, director of research; F. Olmsted, director of development; J. S. Atwood, manager of engineering development and E. A. Yeager, manager of legal and contracts.

The New York office of **Velsicol corp.** has been moved to the Empire State Building. All activities pertaining to sale and distribution of Velsicol products in foreign markets and on the Eastern seaboard will be directed from the new address.

Associations & Meetings

Southern Control Officials Meet

The Association of Southern Feed and Fertilizer Control Officials will meet in the Jung hotel, New Orleans, La., on June 22-24 for its thirteenth annual convention.

E. A. Epps, Jr., president of the group and chief chemist of the Louisiana Dept. of Agriculture and Immigration, will deliver the first address. Also on the opening day's program are "Essential Relations Between Control Officials and Agronomists," M. B. Sturgis, head of Louisiana State University's Agronomy dept.; "Fertilizer Grades," Frank E. Boyd, Virginia-Carolina Chemical corp.; "Our Cooperative Efforts," E. C. Boudreau, chief, New Orleans district, FDA; "The Feed Law and Custom Mixing," Fred Brock, chief, Texas Feed Control Service; and "Industry's Stake in Regulatory Laws," W. F. Williamson, Louisiana Agr. Supply co. Banquet speaker will be C. H. Fisher, chief, Southern Regional Research Laboratory, New Orleans.

On June 23, meetings are scheduled for the Feed Standards committee and Fertilizer committee. A round table for control officials and reports of committees will be presented on the 24th, with adjournment at noon.

NJCFA-ASA Program

On Monday, August 15, a cooperative program will be given by the National Joint Committee on Fertilizer Application and the American Society of Agronomy at the University of California, Davis.

With the NJCFA vice chairman, D. G. Aldrich, Jr. of the University of California presiding, the following talks will be presented:

"Unsolved Problems of Soil Fertility in the West," Frank G. Viets, USDA; "A Comparison of the Fertilizer Value of Gaseous, Liquid and Solid Forms of Ammonium-Containing Nitrogen Compounds," O. A. Lorenz, University of California; "Application of Fertilizers Through Sprinklers," D. W. Henderson, University of California; "Irrigation-Fertilization Inter-Relationships as They Affect Yield and Quality of Sugar Beets," Jay L. Haddock, USDA; "Recent Developments in Farm Placement Machinery," Tobias Grether, Grether Equipment co., and "Fertilizer Application and Improved Crop Yields in the West," B. A. Krantz, USDA.

Rename Chemurgic Group

Council for Agricultural and Chemurgic Research is the name for the former National Farm Chemurgic Council. Henry T. McKnight, president, announced that the reorganized council's aim is to promote agricultural research and extension of its findings.

New MCA Members

Quaker Oats co. (Chemicals dept.) and Standard Oil co. (Ohio) (Petrochemical dept.) have joined the Manufacturing Chemists' Association, MCA recently announced.

CHEMICALS

New USDA Heptachlor Label Recommendations

New label recommendations for heptachlor formulations as emulsifiable concentrates, wettable powders and dusts have been announced by USDA.

Heptachlor 2E-Emulsifiable (2 pounds Heptachlor per gallon). For control of armyworms on alfalfa and clover: 23.41 per cent heptachlor. This specification applies for control of cutworms on alfalfa, clover and tobacco.

Heptachlor 25 per cent Wettable Powder. For control of armyworms on alfalfa and clover: 25 per cent heptachlor. It also applies to cutworms on tobacco as well as alfalfa and clover.

Heptachlor 2½ per cent Dust. For control of cutworms on alfalfa, clover and tobacco: 2.50 per cent heptachlor. This specification also applies to armyworms on alfalfa and clover.

Hep Repellent Aerosol

Bostwick Laboratories now is marketing a push button aerosol spray which is said to be non-irritating, nonstaining and not harmful to plastic, nail polish, watch straps, crystals or nylon.

Named "Hep Insect Repellent," the product is packaged in a five-ounce can.

Dinitros Tested on Psylla

Tests conducted at the Cornell Experiment Station have shown that dinitro sprays are especially toxic to eggs and young of the pear psylla, Prof. F. G. Mundinger reports, adding that parathion and some other phosphorus insecticides are highly toxic to both eggs and adults.

Telvar W for Weed Control in 6 States

Control of trees and brush by soil application of Telvar W weed killer now is recommended for utility rights-of-ways, railroads and drainage ditches in six states, reports DuPont co.

For effective kill, the stem of the plant is encircled with a ring of spray, about a foot from the base. The sprayed ring should be about four inches wide. Two to four ounces of the chemical are used in each gallon of spray.

Present recommendations for this method of using "Telvar" W substituted urea herbicide apply only to Oklahoma, Texas, Kansas, Missouri, Arkansas and Louisiana.

Cyanamid Amino Triazole

American Cyanamid co. has announced the availability of amino triazole in limited quantities.

A four pound package of amino triazole can be furnished under an experimental label, at a price of $10.00, $2.50 per pound. Full instructions on suggested uses and rates are included on the label. Orders for the $10 package, with a check or money order to cover, should be sent direct to American Cyanamid co., Nitrogen dept., 30 Rockefeller Plaza, New York City 20.

New Ammate Formulation

DuPont co. has announced a new, more concentrated formulation of Ammate weed and brush killer. Named Ammate X, the formulation contains 95 per cent of the active ingredient, ammonium sulfamate, instead of 80 per cent.

Packaged in 60 and 40 pound fiber drums, the product will normally be used at the rate of 60 pounds per 100 gallons of water.

Delrad for Algae Control

Delrad has been found to be unusually effective for control of algae in farm ponds, lakes, irrigation canals and other bodies of water, according to a recent announcement by Hercules Powder co. Small amounts of the chemical not only destroy the algae but act to disintegrate it.

Delrad can be applied by three methods: spraying after dilution in water and in burlap bags dragged by an outboard powered; or through a wooden float with screen bottom.

For some time it will be available only in the South, produced at Macon, Ga. facilities.

CSC

ANHYDROUS AMMONIA
82.3% N

The most economical and concentrated source of nitrogen available as a plant food. As a fertilizer it is applied directly to the soil and through irrigation. It is widely used by the fertilizer manufacturer for ammoniating superphosphates and as a basic source of N in combined plant-food forms.

AQUA AMMONIA

Convenient form of nitrogen for high-analysis formulations and acid oxidation. Nitrogen content approx. 20% in most widely used grade. Various concentrations available to suit your special need.

NITROGEN SOLUTIONS
CSC 101 – 40.6% N
CSC 102 – 40.8% N
CSC 103 – 37.0% N

Nitrogen solutions provide the lowest cost and most efficient media for quick curing of superphosphates. They supply more total N than any other ammoniating media. CSC Nitrogen Solutions offer the fertilizer manufacturer a wide range of physical properties to meet all requirements.

CSC AMMONIUM NITRATE FERTILIZER 33.5% N

New, crystalline form made by CSC's exclusive process. New process assures low moisture, free flow, and excellent handling and storage characteristics. CSC Ammonium Nitrate Fertilizer is going to the farmer through leading fertilizer manufacturers.

AGRICULTURAL CHEMICALS

COMMERCIAL SOLVENTS CORPORATION

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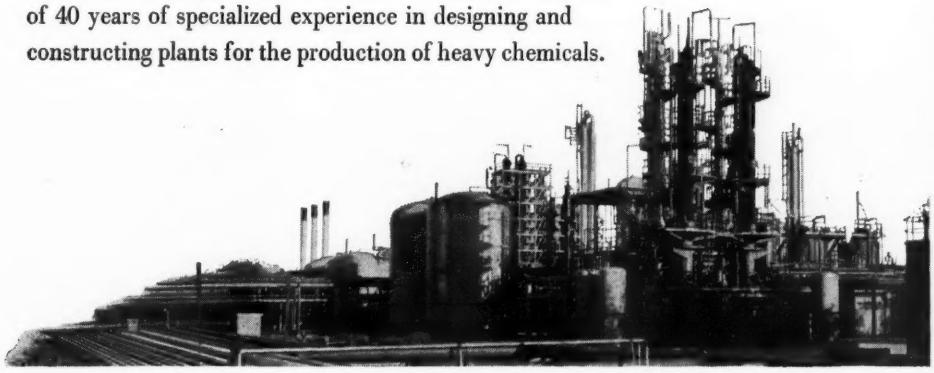
CHEMICO

It's Your Move!

If you are planning to build a Chemical Process Plant—consult CHEMICO first • Chemico gives you the benefit of 40 years of specialized experience in designing and constructing plants for the production of heavy chemicals.



CHEMICAL CONSTRUCTION CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY

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Cable Address: Chemiconst, New York • Technical Representatives: Cyanamid Products Ltd, London
South African Cyanamid (Pty) Ltd., Johannesburg

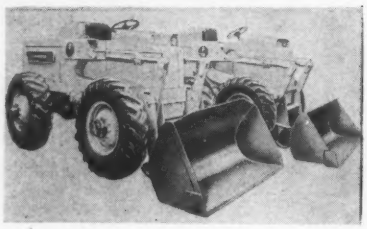
CC 282

Equipment & Supplies

RS 242. New Hough Payloaders

Two new Payloader tractor-shovels which have been in the process of development for more than five years have been introduced by The Frank G. Hough co.—the model HU, with a one cubic yard heaped-capacity and the HH, with a one and one-half yard heaped-capacity.

Outstanding among the features of the new models, says Hough, is a design which permits 40 degrees of bucket breakout at ground level rather than at a three or four foot carry position. For maximum loads with a minimum of effort, powerful "pry-out" action is accomplished through breakout pads on the ground as a fulcrum for leverage. Opposing load forces are transferred to the ground through the pads during breakout instead of to the axle, wheels and hydraulic system.

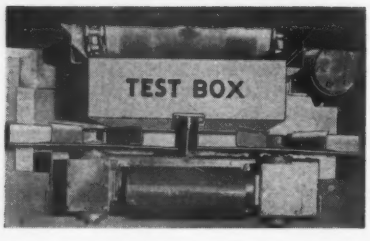


A combination of underslung boom-arm design and positioning provides complete driver visibility and safety. The need for safety guards or screens to protect the driver from the boom-arms has been eliminated.

For full details and specifications, circle 242 on the Reader Service card.

RS 243. New Leader Meter

Highway Equipment co.'s New Leader metering device, which fits all late model New Leader agricultural spreaders, accurately measures the amount of fertilizer being fed to the twin distributor discs.



Highway states that it provides a simple and foolproof method of obtaining the correct feedgate setting with no mechanism to breakdown or go out of adjustment.

For full information and prices circle 243 on the Reader Service card.

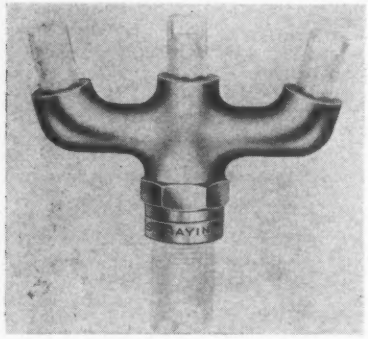
McCloskey's Design 12

A new standard prefabricated building called Design 12 is announced by McCloskey co. of Pittsburgh. Robert F. McCloskey, president, said the building for which structurals are now being fabricated in nine plants of the American Bridge div. of US Steel, "represents a new concept in design." McCloskey added they guarantee every purchaser that all steel members will fit together exactly.

RS 244. Triple Head Spray

The new Spraying Systems No. 6115 triple spray head is designed for use with 1/4U VeeJet Nozzles to speed and improve effectiveness of tree spraying with low-gallonage sprays.

Small capacity VeeJet nozzles with narrow spray angles ranging from 15° to 25° mounted in the triple spray head provide a well atomized spray with



ample projection to reach to tops of fruit or other trees of comparable heights.

For a data sheet on the spray head, circle 244 on the Reader Service card.

New Cans for Boyle-Midway

Labels of Boyle-Midway, Inc., division of American Home Products corp., are now appearing in retail stores on something entirely new in metal oblong cans.

The new self-stacking can permits a 50 per cent improvement in display at point of sale, results in simplified han-

Old **New**

dling on filling lines plus economies in storing and shipping because the stacking feature reduces cubic volume. It has a nozzle in the center, and a bottom with drawn recess which registers on the nozzle of the supporting can, so that all layers stack right side up.

Crown Cork and Seal co., which developed the technical design, reported that by June 1 it could ship this design, at no increase over standard prices, to all "F" style can users.

Union Bag Campaign

A publicity campaign to increase use of fertilizer by farmers is announced by **Union Bag and Paper corp.** Sidney K. Bradley, vice president in charge of multiwall bag sales, reports that his company is releasing stories each month to 2,600 weekly farm newspapers.

Bradley

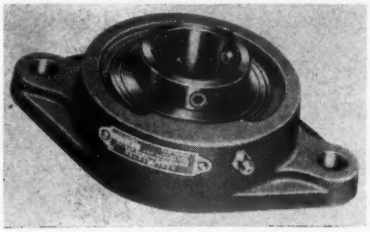
Each story in the series hits primarily at soil fertility and successful farm management through fertilizer usage.

"Union planned this publicity campaign to supplement consumer promotions by fertilizer manufacturers," Bradley said. "We hope that our program will create an even wider spread awareness at the farm level of the benefits to be derived from wise fertilizer usage."

For information on numbered items use the Reader Service Card

RS 245. S/A Bearing Unit

Sealmaster div. of Stephens-Adamson Mfg. co. now is marketing a two bolt flange ball bearing unit. Interchangeable with the Sealmaster four bolt flange units on the diagonal bolt hold dimen-



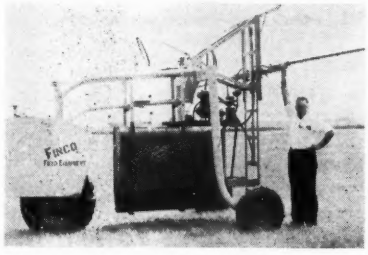
sion, it is available in shaft sizes from ½ to 2-1/16 inches. The unit retains all Sealmaster patented design features.

On new installations, the bearing eliminates two fasteners as well as the punching or drilling operation for two mounting holes. In addition, it cuts installation costs and allows for closer bearing spacing on multiple shaft installations. As a replacement bearing, the unit fits the diagonal bolt centers on present four bolt base flange units and carries the same load rating for a given shaft size.

For a bulletin, circle 245 on the Reader Service card.

RS 246. Finco Sprayer

Finco, Inc.'s high clearance tractor is the basic part of any of the company's sprayers, the company states. The heavy duty frame has full 7 foot clear-



ance and the 90″ rear tread gives stability and flexibility for various row crops.

All sprayers come complete with tanks, booms, downdrops, nozzles and other necessary material for the spraying job.

For literature on Finco high clearance sprayers, circle 246 on the Reader Service card.

Kromer Hy-Row Sprayer

O. W. Kromer co. reports it has developed a powerful, heavy-duty Hy-Row Sprayer which features a 25 hp driving engine.

The Hy-Row has a heavy-duty low-speed tractor transmission which allows continuous operation in all speeds, heavy-duty Rockford Disc Oil clutch and oversized Power Grip front tire and large implement rear tires. A patented coating baked on both the inside and outside of all tank and boom services provides complete resistance to corrosion and rust from all spray chemicals and concentrated fertilizers.

RS 247. St. Regis Closure

St. Regis Paper co. announces that it has developed a stronger, more economical multiwall bag closure utilizing rayon thread and flat kraft tape.

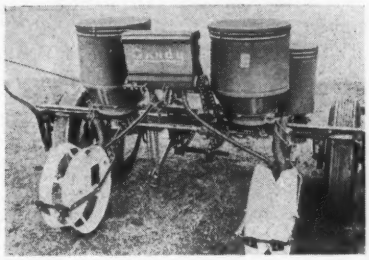
This closure now is available on St. Regis sewn valve bags and factory-closed ends of open mouth bags. In cooperation with rayon manufacturers, St. Regis has developed several weights and types of rayon thread which can be used on sewn bags instead of plain cotton thread.

For more information circle 247 on the Reader Service Card.

Gandrud Row Planter

E. S. Gandrud co. says its new row planter attachment eliminates mixing of insecticides with fertilizer and accurately applies dry granular insecticides as planting is done.

Developed and tested in 1954, the attachment mounts on either 2- or 4-row planters to place dry insecticides with



fertilizer in the row. It is designed to mount between seed cans. A gauge on the chemical hopper allows setting of various application rates.

Suppliers' News

Three senior salesmen have been named sales supervisors by **Bemis Bro. Bag co.**, U. E. Philpott, who will supervise sales in Indiana and Ohio; R. C. Thomas, who will have charge of the Detroit sales office and supervise sales in Michigan and F. H. Schardt, manager of the Louisville sales office, who will head Kentucky sales. They will report to A. C. Greer, sales manager for the Indianapolis Sales div.

Other Bemis personnel moves: H. F. Wilson from Detroit to Indianapolis to assist in sales promotion; E. G. Harvey, from assistant sales manager to plant merchandiser for the Indianapolis plant; J. A. Davies from Louisville to Grand Rapids and F. L. Ashinger to Detroit.

Ayers

Bemis has named F. W. Ayers sales manager of its Vancouver, Wash., multiwall bag plant and R. J. McDonald, sugar bag sales manager for the Packaging Service dept. in Minneapolis.

Bemis Bro. Bag co.'s president, F. G. Bemis, has been reelected a board member of the National Industrial Conference Board for a term of one year.

A steam turbine, centrifugal compressors and pumps for Northern Chemical Industries anhydrous ammonia plant under construction at Searsport, Me., will be supplied by **Dravo corp.** The contract was awarded to Dravo by The Girdler co.

Fulton Bag and Cotton Mills has appointed two managers for its St. Louis territory.

Moenkhaus

August W. Moenkhaus has been named manager of Textile and multiwall bag sales for that area. After joining Fulton over 28 years ago, Moenkhaus served in production capacities at the plant and as sales representative. Prior to his promotion he was supervisor of textile bag sales.

Ryan

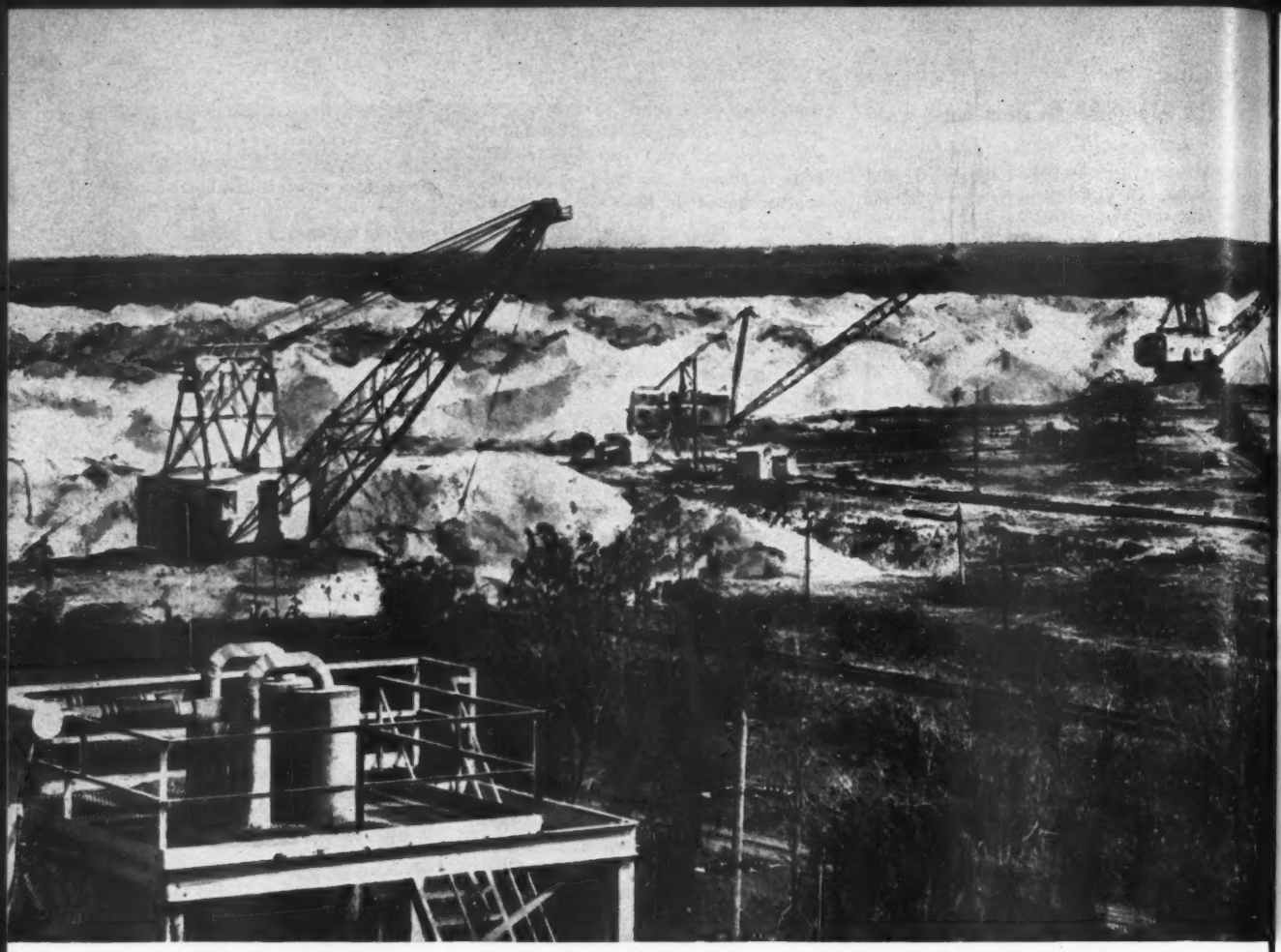
New manager of the St. Louis Multiwall Paper Bag div. is John Fulton Ryan, who started with the firm 25 years ago in St. Louis. He has served in the sales office, as sales representative and as assistant manager of Fulton's Denver plant. For the past two years he has been in charge of multiwall sales in the St. Louis area.

Harry Kanatzar has joined **Fulton's** Denver office as sales representative.

John P. Witter has been appointed by **Kraft Bag corp.** to represent the firm in North and South Carolina and Virginia.

Sauerman Bros., Inc., has moved its general offices to 620 S. 28th Ave., Bellwood, Ill. The new office building is adjacent to the company's Bellwood plant and provides enlarged facilities for all departments.

For information on numbered items use the Reader Service Card



Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

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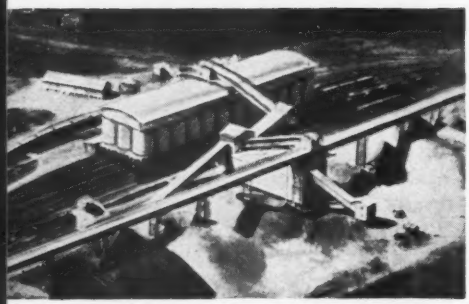

From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
Sulphuric Acid **Fluosilicates** **Insecticides and Fungicides**
Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

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Washington Report

By John Harms

A break in the farm price support deadlock now appears in the making. It may come this year, although progress to date indicates a new approach can't be legislated by Congress until 1956.

Developments that seem to be building up could have far-reaching effects on your business, particularly for the fertilizer industry. They point to an easing in acreage restrictions and possible increase in spendable farm income.

Search for a middle ground approach to the support deadlock is based on the growing conviction that price supports alone are not a guarantee of farm prosperity and stability.

Neither high rigid nor flexible support backers see much chance of settling their differences this year—and prospects are not bright for next year. There is only the remotest possibility that Congress can put through a new price support program this year—and even if it does, Eisenhower will not back down on his determination to veto 90 per cent price supports.

There is renewed talk of compromise for the "basic" crops—corn, wheat, cotton, peanuts and rice—but Congress doesn't appear to be in a mood for compromising. A compromise would involve keeping the flexible price support range from 82½ to 90 per cent of parity, instead of 75 to 90 per cent due to become effective in 1956.

A basically new approach to farm programming seems to be gaining ground. It's a multiple approach that includes: (1) Expanded research, (2) an all-out drive to recapture foreign farm markets, (3) greater freedom of production, (4) more emphasis on soil-building and (5) encouragement of part-time farming and off-the-farm employment to raise farm income levels.

Main argument, of course, is that such a program would reduce the necessity for price supports. Gradual withdrawal of supports as a continuing policy would, it is argued, be possible if other measures are taken to bolster farm income.

Big stumbling block to this shift is the $8.5 billion surplus stockpile owned by the Government. Under a start-all-over-again proposal these stocks would be divided into (1) those to be insulated from the market and (2) those to be gotten rid of abroad at almost any cost.

First break in the current deadlock—which could set the Congressional wheels into motion—may come this month when growers vote on whether they want wheat marketing quotas on the 1956 crop.

There's growing speculation that growers will turn down quotas under which they must pay cash penalities if they don't stick to the rules. This would mean wheat production without effective restrictions. Their choice boils down to either (1) tight acreage restrictions based on allotments of 55 million acres, plus support at about 80 per cent of parity, or (2) no effective restrictions and price support at 50 per cent of parity for those who stayed within weaker acre allotments which would be in effect anyway.

If farmers veto quotas, officials fear they will over-plant widely—seriously aggravating our big wheat surplus problem. This in turn could have a lower-price effect on corn and other feed grains, encourage livestock production—all of which points to a lower economic level for agriculture.

If quotas actually are turned down, to Washington it will mean farmers are getting fed up on strict acreage restrictions. It may be the go-ahead sign that farmers are impatient to get "off center" on farm programs.

Congress is standing by to soften the wheat price adjustment if quotas are defeated. Action is likely to be an increase in the support level permitted under current law if quotas are defeated—from the maximum 50 per cent of parity (about $1.20 per bushel) to 65 per cent (about $1.55). Thus, wheat growers who wanted to could stay within allotments and get $1.55 per bushel for their wheat, but those who didn't could produce as much as they wanted without cash penalty.

This type of action would open the door for growers of other basic commodities—cotton, tobacco and rice—for similar treatment. In other words, these producers would be offered lower supports in exchange for increased acreage. These are major export commodities, along with wheat, and the support price probably would be pegged just below the world price. Thus, say advocates of this approach, excess production could be gotten rid of abroad, and farmers income could be maintained at a high level through volume production.

If quotas are approved for the 1956 crop when the referendum takes place July 25, advocates of this approach will attempt this change anyway. A wheat quota turn-down, however, would provide impetus to the change.

Federal income tax relief now looks almost certain in 1956. Budget-balancers now believe the Government will be in the "black" by 1956 or 1957. This raises official hopes that the Republican Administration can offer tax relief next year—a presidential election year.

Present top-level thinking is that tax relief will be mainly in personal income tax benefits and excise tax reductions. Also, some relief for individuals in higher tax brackets.

Democrats' effort to cut taxes this year, looked on here generally as politically-motivated, fell through when the President balked. Ike opposed because the budget still is in the "red" this year. But if Treasury men have it figured right, it means that Mr. Eisenhower will have made good on one of his biggest campaign platforms—balance the budget and provide income tax relief.

Price and wage controls definitely are being considered by the Administration. The Office of Defense Mobilization is urging the White House to request stand-by emergency authority to freeze prices and wages now. Not that ODM sees immediate war. It merely wants to have the authority in the shelf on an if-and-when basis for use at a moment's notice if it becomes necessary.

Strong opposition has developed from business, labor and agriculture. Some top-level Administration people also are opposed to a request at this time because of inflationary effect it might have.

Don't look for the Administration's program of Federal aid to low-income farmers to much more than get off the ground this year. While Congress generally agrees with the aim, it and the Administration are far apart on the degree of help.

Democratic leaders feel the Administration proposals don't go far enough in credit line. And they read black meanings into a proposal to steer low-income farmers off the farm and into city employment.

Recommendations of the Benson-authored program aim at (1) increasing productivity and efficiency of farmers now in the low income brackets, (2) greater opportunities for increased off-farm income and (3) shifting of more farmers off the land and into industrial employment. Benson estimates there are 1.5 million low-income farmers, interpreted as those farmers who have less than $1,000 cash income annually.

Burley tobacco growers have overwhelmingly approved a bigger cut in acreage for 1955 than they had originally accepted. In December, the Agriculture department had set a 15 per cent reduction from 1954. But because of larger-than-expected supply, it found it necessary to cut it even further. For this, it was required to get grower approval. As a result of the redetermination and grower "yes" vote, acreage in burley this year will be a total of 25 per cent less than last year.

Rice growers get about 70,000 more acres in this year's allotment than the original 1,850,000 acre allotment. Congress approved this 2 per cent increase to alleviate some hardship. At that, growers take a 22 per cent cut from last year's crop.

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A fine program is planned for the better than 800 persons expected at the

First NPFI Convention

OVER 800 industry leaders are expected to attend the preliminary convention of the National Plant Food Institute at The Greenbrier, White Sulphur Springs, W. Va., June 12-15. The new trade association will be formed by consolidation of the American Plant Food Council and the National Fertilizer Association, effective July 1.

After registration on Sunday, June 12, the convention program will begin Monday morning with a forum reviewing problems relating to fertilizer-pesticide mixtures. Moderator will be American Cyanamid's M. V. Bailey, and speakers include K. D. Jacob, USDA; C. T. Harding, Virginia-Carolina Chem. corp.; John D. Conner, Sellers & Conner and Rodney C. Berry, Virginia state chemist.

Sen. McClellan

Also on the agenda for June 13 is a meeting of the board of directors-elect and during the afternoon, a ladies' garden party, a refreshment hour (courtesy of nitrogen producers), a dinner and open house.

Featured on Tuesday's schedule is an address by E. L. Peterson, assistant secretary of agriculture, and a panel of representatives of FFA, 4-H Clubs and NJVGA. E. A. Geoghegan, NFA board chairman, will preside and address the convention, and Edwin Pate, Laurinburg, N. C., will speak as chairman of the Executive committee of APFC.

Participating in the youth panel will be Prof. Wm. B. Ward, Cornell University; Wm. D. Gunter, FFA national president; Lamar Ratliff, 4-H representative; Joe Strickland and Tommy Dotson representing NJVGA.

Following a refreshment hour, the annual banquet will conclude the Tuesday program.

Two legislators are scheduled to appear at the June 15 session—Senator John L. McClellan (D-Ark.), chairman of the Senate Committee on Government Operations, and Rep. Harold D. Cooley, (D-N.C.), chairman of the House Committee on Agriculture. "In Memorium" resolutions will be presented by George Gage prior to the addresses.

Rep. Cooley

Also on the Wednesday program will be a presentation by Louis H. Wilson, APFC secretary and director of information, of scrolls to winners in the Soil Builders Award for Editors contest.

Members of the Convention committee include Ralph B. Douglass, E. A. Geoghegan, J. A. Howell, John A. Miller, Edwin Pate, C. T. Prindeville, Paul J. Prosser, Sr., John E. Sanford, J. E. Totman and Louis Ware. Chairmen and chairladies of other committees are W. F. Price, Hospitality committee; George W. Gage, Memorial; Dean R. Gidney, Tennis; Mrs. John V. Collis, Ladies'; A. A. Schultz, Horseshoe Pitching Contest; Gene Van Deren, Men's Golf; Mrs. Fred Corkill, Ladies' Golf and Mrs. S. L. Nevins, Bridge and Canasta. ▲

The Youth Forum

W. B. Ward
Moderator

T. Dotson
NJVGA

W. D. Gunter
FFA

L. Ratliff
4-H

J. Strickland
NJVTA

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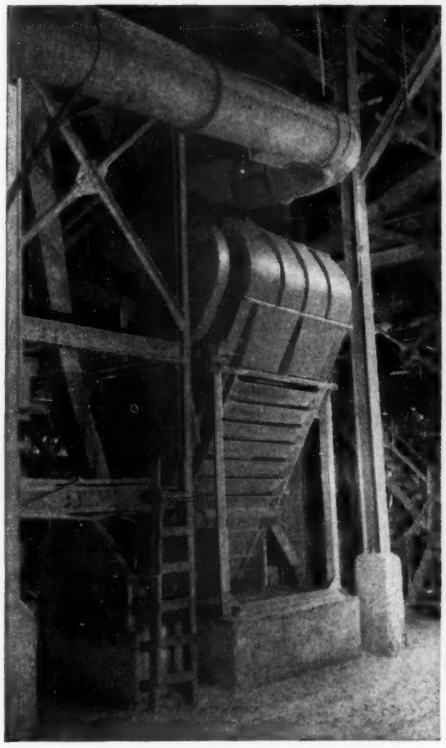
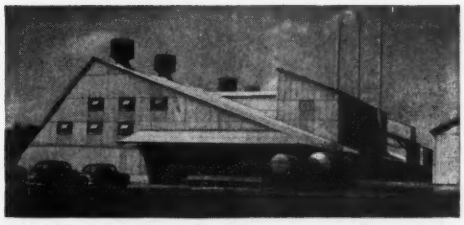
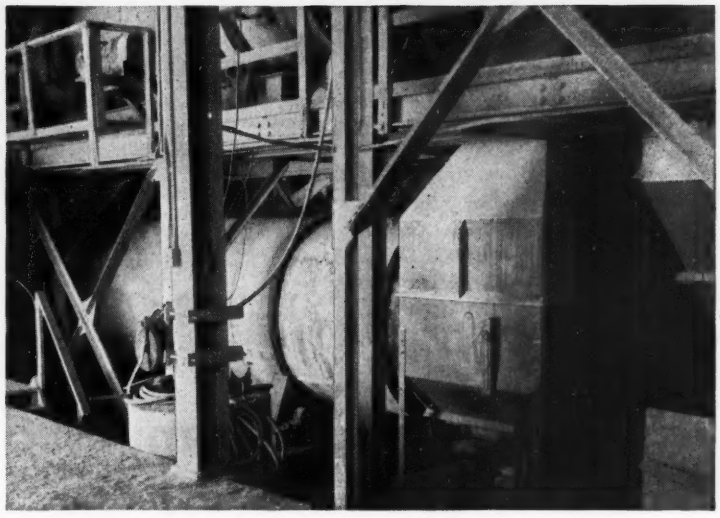


50% more production resulted at Iowa Farm Supply Co., Des Moines, through the aid of Link-Belt engineering counsel. Link-Belt equipment here includes Multi-Louvre Cooler (left), Roto-Louvre Dryer (below), bucket elevator, vibrating screens and power transmission machinery.





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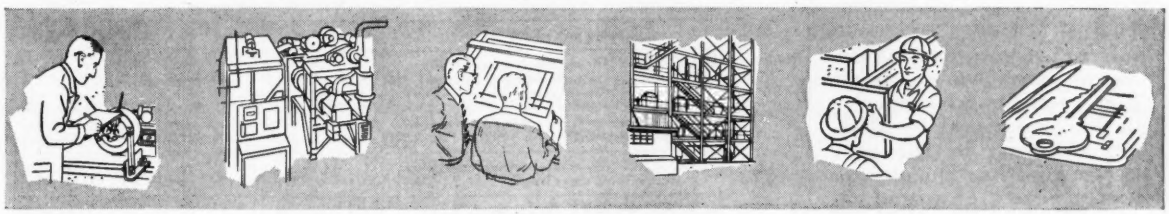

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Rodney Berry has again surveyed all state control officials on the status of

Fertilizer-Pesticide Mixtures

IN April, Rodney C. Berry, director, Div. of Chemistry, Virginia Dept. of Agriculture, surveyed fertilizer and pesticide control officials in the 48 states, Canada, Puerto Rico and Hawaii on the use of fertilizer-pesticide mixtures on food crops.

The Virginia control official is scheduled to participate in a panel discussion at the National Plant Food Institute convention this month and the information will form a basis for his remarks.

Berry has kindly made available the tabulations on sales, registration, labeling and other factors relating to these mixtures and the accompanying table and comments are taken from this material. Readers may recall that in the September, 1954, issue there was a similar article based on an earlier survey by Berry.

The situation is one that changes rapidly so that, although this represents the most up-to-date information available, some changes have probably already occurred.

Berry comments that one control official who reported no sales of mixtures in his state on April 15 wrote, later that month, that applications for sale had been received since that date.

Here is a summary of the second survey of the fertilizer-pesticide mixtures situation conducted by Rodney C. Berry in the past twelve months. The picture has already changed to some degree from that presented in the September, 1954, FARM CHEMICALS.

Here is a summary of the notes compiled by Rodney C. Berry, from the survey sent to fertilizer and pesticide control officials in March, 1955.

Alabama. Regulations will probably be promulgated and placed in effect this year. Farmers Mixtures are permitted upon written order signed by purchaser, with complete formula, tonnage and name and address of purchaser. Such goods must be labeled.

Arizona. New laws HB-147 and HB-143 governing these mixtures were passed by the Legislature this year and will be effective Jan. 1, 1956. Regulations will be in order after that date.

Arizona. The packaging question has not come up, but use of woven bags would not be permitted.

Arkansas. Answers show how control officials think mixtures would be regulated. No application received for sale although some is used on an experimental basis by individuals.

Heavy paper containers probably would not be required and woven bags

Summary of Berry's Fertilizer Pe

X = Yes
— = No comments
= No or no precedent
* = See remarks under state heading

	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Idaho	Illinois	Indiana	Iowa *	Kansas	Kentucky	Louisiana	Maine	Maryland
1. SALES. Are fertilizer-pesticide mixtures sold in your state?	X	X*	*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. REGISTRATION. Are these registered under your Fertilizer law?	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Pesticide law?	X	X	X	X	X		—		X					X		X	X	X
3. FEES. Do you collect regular fees under your Fertilizer law?	X	X	X*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pesticide law?	X	X	X	X	X		—		X					X		X	X	X
4. REGULATIONS. Have you issued regulations covering sale and distribution of these mixtures?	*							X	X			X			X			X
5. PACKAGING. Do you require distribution in heavy paper containers? or do you	—	*	*		X			*		X			*	*		X	X	X
Permit sale in woven bags?	—		X*	X*	X	X	X	*	X	X	X	—	*		X	*	X	
Permit bulk sale?			X*	*		X	X			X	X	X	*		X	*		X
6. LABELING. Do you require a label showing: Fertilizer and pesticide ingredient statement?	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X
Directions for use?	X	X	X	X	X		—		X	X	X	X	X	X		X	X	X
Warning statement?	X	X	X	X	X		—	X	X	X	X	X	X	X		X	X	X
7. RED TAGS. Is a 'red tag' warning required in addition to the above label?					X			X*		—	X	X						
8. BUYERS MIXTURES. Do you permit "Buyers" or "Farmers Mixtures" where a farmer may have any pesticide added to his fertilizer by the manufacturer?	X		X	X		X	X	X*	X	X	X	X	X			*	X	X
Are these subject to regulation under fertilizer and/or pesticide laws?	—	X*	X	X	X			X	X			X	X	X	X	X	X	

	Massachusetts	Michigan	Minnesota
1. SALES. Are fertilizer-pesticide mixtures sold in your state?	X	X*	X
2. REGISTRATION. Are these registered under your Fertilizer law?	X	X	X
Pesticide law?	—	X	X
3. FEES. Do you collect regular fees under your Fertilizer law?	X	X	X
Pesticide law?	—	X	X
4. REGULATIONS. Have you issued regulations covering sale and distribution of these mixtures?		X	X
5. PACKAGING. Do you require distribution in heavy paper containers? or do you	*	X	
Permit sale in woven bags?	*		X
Permit bulk sale?	*	—	X
6. LABELING. Do you require a label showing: Fertilizer and pesticide ingredient statement?		X	X
Directions for use?		X	X
Warning statement?		X	X
7. RED TAGS. Is a 'red tag' warning required in addition to the above label?			
8. BUYERS MIXTURES. Do you permit "Buyers" or "Farmers Mixtures" where a farmer may have any pesticide added to his fertilizer by the manufacturer?	X		X
Are these subject to regulation under fertilizer and/or pesticide laws?		—	X

probably would be permitted as well as, under certain conditions, bulk sale.

California. Requirements of pesticide and fertilizer laws are applied to mixtures as if they were separate items. The official comments that no difficulty has arisen so far.

Florida. Tech. Reg. 5 specifies pesticides which may be mixed with fertilizers and regulates conditions of sale, percentage, use, storage and distribution. "Fertilizers containing pesticides may be made only on special order for prompt use and may not be stocked (except for use on lawns, turf and ornamentals)."

Type of bag has not been specified. A yellow tag is required.

Georgia. Regulations 3-2-55, Sec. 2—Field crop fertilizers with pesticides (Food, Forage, Fibre and Tobacco formulations) may contain those organic pesticides that are known not to effect flavor or are incapable of translocation so as to transmit residues, and may be sold without restriction as to area or package size, except that there be no bulk sales or deliveries of these mixtures. All packages must be labeled showing fertilizer and pesticide guarantees and must conform with both laws. Dual registration under both laws is required.

Iowa. Information is based on the previous survey. No report was received on the current situation.

Kentucky. Before permit is issued mixtures must be labeled as directed by the Kentucky experiment station showing per cent of pesticide, directions for use and a caution or warning statement.

Louisiana. The packaging question has not come up, but paper bags would probably be required. Requirements of the pesticide law would apply to "Farmers Mixtures."

Maryland. Mixtures must be registered under, and meet all requirements of both fertilizer and pesticide laws. The experiment station approves application before registration.

Massachusetts. Very limited sales to date. Experiment station has neither recommended nor discouraged use. Mixtures have been distributed in heavy paper sacks but there is no requirement.

Michigan. Mixtures must be registered under both fertilizer and pesticide laws, meeting all requirements of both. Regulations permitting use were adopted March 14 and a plan for mixtures under these regulations is just beginning to materialize. Regulations are in close accord with those of Virginia.

Minnesota. No regulation requiring paper containers, but they are in common use. "Farmers Mixtures" are permitted, if registered.

Mississippi. No mixtures used so far. One application was received and determined acceptable by the State Plant Board but the company has not completed registration. If mixtures are used, regulations under existing fertilizer and pesticide laws will be established.

Missouri. 6A, B and C are recommended but not required for pesticides. A pesticide bill is now before the legislature.

Nebraska. Aldrin only is sold and volume is very small. The label must state "name of fertilizer with Aldrin," __ per cent of aldrin and purpose for its use.

Nevada. Information is based on the previous survey. No report was received on the current situation.

New Hampshire. Feels that a red tag should be required.

New Jersey. None is sold for food crop use and none is recommended. The experiment station feels it is not the proper way to control pests. Very little interest reported. There are no packaging regulations.

New Mexico. None for use on food crops. but mixtures are registered for use on lawns and ornamentals.

New York. Pesticides need not be registered under the state pesticide law if registered under the Federal act. They must be registered as a fertilizer and be properly labeled. No packaging question to date.

North Carolina. Mixtures are neither recommended nor opposed by the experiment station but acceptance would not be extended beyond chlordane, aldrin, dieldrin, heptachlor, toxaphene and DDT, materials that have been qualified as permissable in mixtures.

Bulk sale questions have not come up but there is no prohibition against such sale. Sale in woven or fabric bags has not been specifically prohibited, but recommendations would be against it. Heavy paper containers are not required, but no package which permitted leakage or dusting out would be acceptable.

Pesticide Mixtures Survey

Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada *	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Canada	Hawaii	Puerto Rico
X	X	X	•	X		X	X	X	•	•	•	X	X	X	X	X	X	•	X	X	X*	•		X	X	X	X	X		X	X	X
X	X	X	—	X*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*	X	X	X	X	X	X*	X		X
—	X	X	—					X	X	X			X		X	X	X	X	X	X	X	—	X*	X	X	X	—	X	X*	X	X	X*
X	X	X	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*	X	X	X	X	X	X*	X*		X
—	X	X	—					X	X	X			X		X	X	X	X		X	X	—	X*	X	X	X	—	X	X*	X	X	
	X	X	—									X*			—			—	X			—	X*		X							
•	X		—		—				•	—	X*	•	X		—					X		—	•		X			—	—	X*	X	
•		X	—	X	—	X		X	•	—	X*	•		X	—	X	X	X	X			—	X*	X		X	X	—	—	X*		X
•	—	X	—	X	—	X		X	•		X*	X*		X	—	X	X	X*	X	X		—	X*	X			X	X	—			X
	X	X	—	•	X	X		X	X	X	X	X	X	X		—	X	X	X	X	X	X	—	X	X	X	X		X	X	X	X	X
	X	X	—	•	X			X	X	X	X	X		X		—	•	—	X	X	X	X	—	—	X	X	X		X	X	X	X	X
	X	X	—	•	X				X	X	X	X	X	X		—	X	X	X	X	X	X	—	X	X	X	X		X	X	X	X	X
			—					•				X			—		X		X*			—										X*
X		X*	—	X	X	X	X	X	X		—	X*	X	X	—	X	X	X*	X		X	—		X			X	X		X	X	•
	—	X	—	X			X	X	X	—	X	X*			—	X*		•	X		X	—	—	X	—		X	X*	X			•

Farmers Mixtures are not recommended or encouraged but there is no prohibition against them.

N. C. regulations 8-36.1 and 8-36.2 cover sale and distribution of these mixtures.

North Dakota. Sales are very small and custom mixed materials for specific problems are only products currently approved. Insecticides with Federal registration for use in mixtures are acceptable within the limits of such registration.

Ohio. Most are made on a custom mix basis and very few are offered for use on commercial crops. They are not as yet recommended by the experiment station for general use.

Oklahoma. None are offered for sale or use on commercial crops. Such mixtures are termed of little importance in this state.

Oregon. Pesticide "warning" label required on Farmers Mixture.

Rhode Island. Apparently none have been sold, so many answers refer to what would be required. Bulk sale would be permitted if properly labeled and Farmers Mixtures if ingredients were registered.

South Carolina. A red tag is not specified but a colored tag is required. It is felt that permission to use different colored tags would be of aid to industry.

Tennessee. Can be sold but none accepted for use on food crops. Toxicants noted in the small table relate to uses other than on food crops.

Texas. Mixtures are refused registration.

Utah. None sold for use on food crops and answers indicate probable action if they were accepted.

Virginia. The state list of approved fertilizer grades includes three with aldrin or heptachlor, for use on peanuts in controlling Southern corn rootworm. No others are recommended or permitted to be sold.

Wyoming. Little interest in mixtures and none registered. Before sale they must be registered and meet all requirements of both laws.

Canada. None recommended for food crops. They must be registered and labeled under both laws.

Puerto Rico. In process of requiring registration. It will be required that the label show ingredient statement for both fertilizer and pesticide, directions for use and warning statement. No decision has been made on use of red tags. ▲

PESTICIDES GENERALLY USED IN FERTILIZER-PESTICIDE MIXTURES

	Aldrin	Chlordane	DDT	Dieldrin	Heptachlor	Lindane	Toxaphene	2,4-D
Ala.	✓	✓	✓	✓				
Ariz.			✓					
Ark.	✓							
Calif.	✓			✓				
Colo.	✓	✓		✓				
Conn.			✓					
Fla.	✓	✓	✓					
Ga.	✓	✓	✓					
Ida.	✓	✓	✓					
Ill.	✓							
Ind.	✓			✓		✓		
Kan.	✓							
Ky.	✓	✓						
La.	✓							
Md.	✓							
Mass.		✓						✓
Mich.	✓	✓						✓
Minn.	✓	✓		✓	✓			
Mo.	✓	✓						
Neb.	✓							
N.H.								✓
N.C.	✓	✓	✓	✓	✓		✓	
N.D.		✓						✓
O.			✓					
Ore.	✓				✓		✓	
Pa.		✓	✓			✓		
S.C.	✓	✓			✓		✓	
S.D.	✓			✓				
Tenn.	✓	✓		✓	✓		✓	
Vt.		✓	✓					
Va.	✓				✓			
Wash.[1]	✓							✓
W.Va.		✓						
Wisc.	✓	✓		✓				
Can.[2]	✓			✓	✓	✓		✓
H.I.[3]								✓
P.R.	✓							

[1] and IPC. [2] and thiram. [3] and 2,4,5-T.

PLANT SAFETY TIP #1

Trash Burning Accident

The Accident Subject employee was burning paper rubbish and a wheel barrow full of dirty hexamine at the rubbish dump.

The employee set fire to a heap of paper, and as he was emptying the wheel barrow full of dirty hexamine . . . a gust of wind blew the hexamine into the air . . . enveloping the employee in a cloud of hexamine dust. The hexamine dust caught fire . . . flashed back and inflicted first and second degree burns on the employee's face.

Time lost on account of accident: Six hours of work while being treated for shock and skin burns.

Cause Most fine dusts when finely suspended in the air will burn . . . generally producing a flash fire. In this particular case the gust of wind caused the dust to be suspended in the air . . . the suspended hexamine in the air surrounding the employee . . . ignited from the burning trash. As soon as the dirty hexamine hit the paper trash fire . . . there was a flash fire produced . . . striking the employee.

Action Taken Specific instruction was given to the men burning trash that no material such as dirty hexamine or any other material which is in a dust form will be dumped on burning trash paper. Whenever it is necessary to burn any material of this type . . . the material will be placed on the trash fire pile . . . covered with more trash paper . . . and *then* ignited.

Presented through cooperation of the Fertilizer section, National Safety Council.

M/W

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Time-saver, money-saver—no wonder burlap is the farmer's favorite bag. Suppliers who are trying to serve the farmers' best interests pack fertilizer in burlap bags. Fertilizer keeps better in ventilated burlap bags and handles easier in the tough, heavy-duty burlap. You can save your own time and money by packing in the good old standby—burlap.

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they'll tell you that burlap

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Gives good ventilation — keeps farm supplies and products fresh.

Laughs at sudden showers — wetness or dampness can't weaken it.

Saves money — extra value from re-sale and re-use.

Saves storage space — stacks to any height without slipping.

Has 1000 uses — always in demand on the farm (popular with farm wives, too!)

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Commercial Fertilizers

Consumption in the United States 1953-1954

By
Walter Scholl
Hilda M. Wallace
Esther I. Fox

Fertilizer and Agricultural Lime Section
Soil and Water Conservation Research Branch
Agricultural Research Service, USDA
Beltsville, Md.

FOR the year ended June 30, 1954, the consumption of fertilizers in the United States and territories amounted to 22,773,499 tons or 2.73 per cent less than the consumption in 1952–53. This quantity comprised 22,157,986 tons of products containing one or more of the primary nutrients (N, available P_2O_5, K_2O) and 615,513 tons of the secondary and trace element materials which did not contain primary nutrients. The consumption of these fertilizers was, respectively, 377,135 tons (1.67 per cent) and 261,974 tons (29.86 per cent) less than that in 1952–53.

Lower Tonnage

Although the tonnage of fertilizers used in 1953-54 was lower than in 1952-53, a new record in total consumption of primary nutrients was set for the fifteenth consecutive year. Thus the consumption of thse nutrients amounted to 5,895,558 tons, an increase of 4.42 per cent (249,502 tons) over that in the preceding year. The consumption of nitrogen increased 12.85 per cent (210,360 tons) to 1,847,416 tons and that of K_2O 3.90 per cent (67,792 tons) to 1,806,042 tons, whereas the consumption of available P_2O_5 decreased 1.26 per cent (28,650 tons) to 2,242,100 tons. The content of total P_2O_5 in all fertilizers decreased 4.28 per cent (118,317 tons) to 2,646,971 tons.

Nutrient Content Up

The average primary nutrient content of fertilizers bearing primary nutrients was 26.61 per cent in 1953–54 as compared with 25.05 per cent for the preceding year.

The data presented herein were compiled from manufacturers reports of shipments to agents, dealers, distributors and farmers in the territories (except Alaska), the District of Columbia, and the states except California, Florida, Massachusetts, Missouri, North Carolina, South Carolina and Texas. For the latter seven states the data were compiled chiefly from the reports of the respective fertilizer control officials. No data were available for Alaska. Supplementary information was furnished by the control offices and other state agencies, as well as by fertilizer brokers, and special inquiries were made of all known distributors and custom applicators of anhydrous ammonia.

The quantities are reported as 2,000-pound tons. Although the data refer to shipments, the terms "consumption," "sales" and "shipments" are used synonymously. The actual consumption differs slightly, no doubt, from either the shipments or sales.

All Fertilizers

The consumption of the two classes of fertilizers, mixtures and materials, is summarized by states and regions in Table 1. The tonnage of all fertilizers consumed in each of 16 states, the District of Columbia, Hawaii and Puerto Rico was higher than in 1952–53.

Based on the tonnages for each six-month period of 1952–53, most of the decrease in total consumption of all fer-

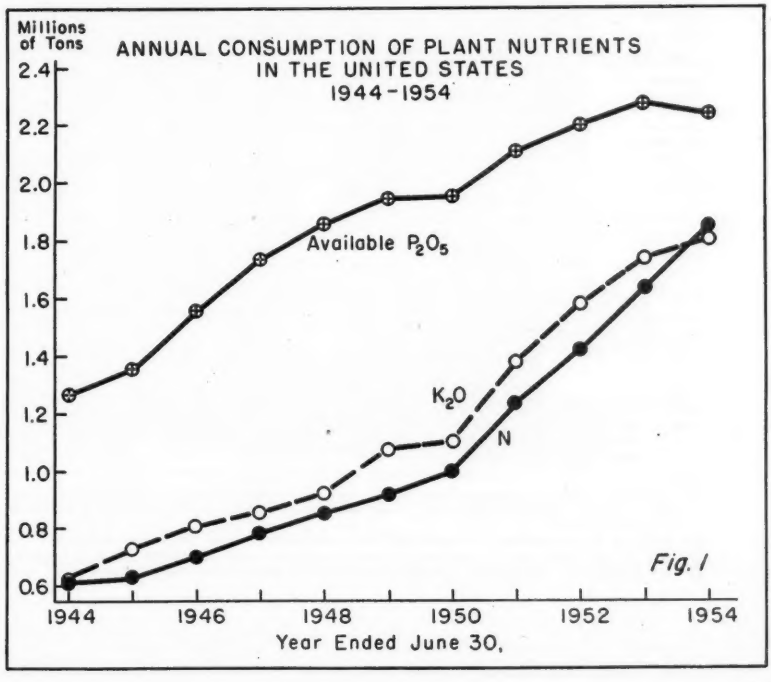

Fig. 1

Table 1. - Consumption of Fertilizers, Year Ended June 30, 1954[1]

State & Region	Mixtures			Materials[2]			All Fertilizers 1953-54	Relative Consumption 1952-53 = 100	
	July 1 - Dec. 31, 1953	Jan. 1 - June 30, 1954	Total	July 1 - Dec. 31, 1953	Jan. 1 - June 30, 1954	Total		Fertilizers [3]	Total N, Avail. P_2O_5 & K_2O
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine	17,703	147,047	164,750	2,516	4,516	7,032	171,782	81	81
New Hampshire	1,444	10,381	11,825	861	3,126	3,987	15,812	74	74
Vermont	3,130	24,434	27,564	5,899	4,978	10,877	38,441	77	85
Massachusetts	10,120	58,998	69,118	4,330	11,572	15,902	85,018	100	98
Rhode Island	1,839	11,616	13,455	633	1,378	2,011	15,466	100	100
Connecticut	6,395	58,808	65,203	3,525	21,508	25,033	90,236	104	106
New England	40,631	311,282	351,913	17,764	47,078	64,842	416,755	89	88
New York	94,453	418,689	513,142	39,738	56,565	96,303	609,445	92	96
New Jersey	50,635	215,403	266,038	8,351	16,619	24,970	291,008	106	105
Pennsylvania	156,080	452,097	608,177	24,890	47,880	72,770	680,947	97	100
Delaware	13,409	75,364	88,773	931	5,177	6,108	94,881	105	109
District of Columbia	565	1,342	1,907	458	333	791	2,698	104	105
Maryland	75,804	218,421	292,025	5,800	14,718	20,518	312,543	103	106
West Virginia	13,191	54,660	67,851	3,722	5,610	9,332	77,183	88	89
Middle Atlantic	401,937	1,436,976	1,837,913	83,890	146,902	230,792	2,068,706	98	100
Virginia	147,453	537,648	685,101	22,296	91,866	113,962	799,063	94	95
North Carolina	218,046	1,272,600	1,490,646	46,390	312,163	358,553	1,849,199	98	98
South Carolina	100,945	571,078	672,023	41,709	227,389	269,098	941,121	96	98
Georgia	158,151	944,555	1,102,706	50,260	216,068	266,328	1,369,034	98	104
Florida	415,334	656,196	1,071,530	46,113	67,038	113,151	1,184,681	103	104
South Atlantic	1,039,929	3,982,077	5,022,006	206,768	914,524	1,121,092	6,143,098	98	100
Ohio	308,914	709,228	1,018,142	24,150	51,876	76,026	1,094,168	93	99
Indiana	235,604	788,496	1,024,100	49,755	106,873	156,628	1,180,728	98	106
Illinois	169,980	461,540	631,520	411,552	463,075	874,627	1,506,147	91	105
Michigan	156,891	388,340	545,231	17,812	37,349	55,161	600,392	93	99
Wisconsin	70,210	331,931	402,141	10,498	28,564	39,062	441,203	105	112
East North Central	941,599	2,679,535	3,621,134	513,767	687,737	1,201,504	4,822,638	95	104
Minnesota	48,285	203,289	251,544	20,145	51,086	71,231	322,775	121	132
Iowa	86,053	334,811	420,864	80,875	150,421	231,294	652,158	118	126
Missouri	141,683	327,052	468,735	114,778	173,107	287,885	756,620	91	108
North Dakota	6,419	16,639	23,058	9,952	14,667	24,619	47,677	118	121
South Dakota	2,299	11,100	13,399	4,676	11,932	16,608	30,007	180	202
Nebraska	12,790	53,156	65,946	41,897	91,273	133,170	199,116	156	187
Kansas	53,725	45,847	99,570	63,640	52,679	116,319	215,889	90	96
West North Central	351,252	991,864	1,343,116	336,961	545,165	881,126	2,224,242	106	123
Kentucky	53,979	398,794	452,773	35,289	93,521	128,810	581,583	95	100
Tennessee	70,133	324,999	395,132	40,502	88,460	128,962	524,094	90	92
Alabama	91,584	745,949	837,533	113,722	232,239	345,961	1,183,494	94	98
Mississippi	19,889	334,519	354,408	140,371	239,949	380,320	734,728	100	107
East South Central	235,585	1,804,261	2,039,846	329,884	654,169	984,053	3,023,899	95	100
Arkansas	18,968	174,831	193,797	35,592	141,288	176,880	370,677	101	109
Louisiana	28,581	144,781	173,362	44,324	100,480	144,804	318,166	100	106
Oklahoma	24,323	40,191	64,514	50,148	30,328	80,476	144,990	99	109
Texas	60,663	220,724	281,387	125,808	153,800	279,608	560,995	99	102
West South Central	132,535	580,527	713,060	255,872	425,896	681,768	1,394,828	100	106
Montana	1,103	3,131	4,234	11,894	12,974	24,868	29,102	112	120
Idaho	72	6,714	6,786	30,756	52,452	83,208	89,994	122	141
Wyoming	55	2,324	2,379	2,965	5,888	8,853	11,232	88	99
Colorado	3,224	11,466	14,690	10,146	22,938	33,084	47,774	97	110
New Mexico	172	1,975	2,147	5,570	14,645	20,215	22,362	81	82
Arizona	5,619	15,843	21,462	38,843	94,896	133,739	155,201	112	109
Utah	270	3,351	3,621	9,427	15,369	24,798	28,417	89	102
Nevada	201	672	873	2,737	5,545	8,282	9,155	94	93
Mountain	10,616	45,576	56,192	112,338	224,707	337,045	393,237	106	112
Washington	5,777	23,853	29,630	58,469	113,172	171,641	201,271	131	134
Oregon	4,619	17,480	21,979	45,347	80,074	125,421	147,400	99	107
California	83,168	138,096	221,264	581,660	723,042	1,304,702	1,525,966	108	103
Pacific	93,464	179,409	272,873	685,476	916,288	1,601,764	1,874,637	109	108
Continental U. S.	3,247,546	12,010,507	15,258,053	2,541,720	4,562,266	7,103,986	22,362,039	98	104
Hawaii	30,237	28,927	59,164	36,245	44,639	80,884	140,048	108	106
Puerto Rico	92,239	131,620	223,859	25,454	22,119	47,553	271,412	110	108
Alaska[4]	---	---	---	---	---	---	---	---	---
Territories	122,476	160,547	283,023	61,679	66,758	128,437	411,460	109	107
Totals: 1953-54	3,370,022	12,171,054	15,541,076	2,603,399	4,629,024	7,232,423	22,773,499	98	104
1952-53	3,687,360	12,034,864	15,722,224	3,067,991	4,622,393	7,690,384	23,412,608	100	100
1951-52	3,533,404	11,552,945	15,086,349	2,856,958	4,489,111	7,346,069	22,432,418	96	92

1/ Includes: Ground phosphate rock, basic slag, secondary and trace element materials, such as, borax, sulfur, manganese sulfate, etc., used as separate materials, also fertilizers distributed by Government agencies. Does not include liming materials, but includes gypsum.

2/ Excludes the quantities of materials used for manufacture of commercial mixtures.

3/ Fertilizers which were guaranteed to contain primary plant nutrients (N, P_2O_5, K_2O).

4/ Not available: Consumption of all fertilizers in 1952-53 amounted to 653 tons.

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tilizers in 1953–54 occurred in the July-December period. Consumption for this period in 1953–54 was 781,930 tons (11.57 per cent) below that for the corresponding period of 1952–53, while for the January-June period consumption was 142,821 tons (0.86 per cent) above the quantity for the same period of 1952–53. During the fall period, there was a decrease of 317,338 tons of mixtures and 464,592 tons of materials, while in the spring period the consumption was higher by 136,190 tons of mixtures and 6,631 tons of materials.

Regional distribution of the consumption of all fertilizers in 1952–53 and 1953–54, as percentages of the country totals, is shown in Table 1a.

In Table 1, the percentage change in consumption of fertilizers in 1953–54 as compared with 1952–53 is based on the tonnage of primary nutrient fertilizers only, in order that a direct comparison may be made with the percentage change in consumption of the primary nutrients themselves.

Mixtures

Mixed fertilizers consumed in the United States and territories amounted to 15,541,076 tons, as compared with 15,722,224 tons in 1952–53. The quantity of mixtures consumed in 1953–54 was 68.24 per cent of the total fertilizer tonnage, as compared with an average of 67.46 per cent for the preceding five-year period. In 1953–54, 1,319 grades were reported by their guaranteed analysis. It is estimated that additional grades approximating 500 in number were reported under unspecified designatoins.

TABLE 1a. Regional Percentage Distribution of Consumption of All Fertilizers

Region	1952-53	1953-54
New Eng.	2.01	1.83
Mid. Atlantic.	9.05	9.08
So. Atlantic.	26.79	26.97
E. No. Cent.	21.79	21.18
W. No. Cent.	8.95	9.77
E. So. Cent.	13.62	13.28
W. So. Cent.	5.99	6.12
Mountain	1.55	1.73
Pacific	8.64	8.23
Territories	1.61	1.81
United States	**100.00**	**100.00**

Table 2. – Consumption of Principal Mixed Fertilizers in the Continental United States, By Grades, Years Ended June 30, 1953 and 1954

Grade	Consumption		Proportion of Total		Grade	Consumption		Proportion of Total	
	1952-53[1]	1953-54	1952-53	1953-54		1952-53[1]	1953-54	1952-53	1953-54
	Tons	Tons	Percent	Percent		Tons	Tons	Percent	Percent
0-8-24	4,026	5,488	0.03	0.04	6-8-6	239,870	195,320	1.55	1.29
0-9-27	28,497	15,510	.17	.10	6-8-8	274,168	288,134	1.77	1.89
0-10-10	3,184	4,387	.02	.03	6-8-12	48,704	40,844	.32	.26
0-10-20	62,993	49,130	.41	.32	6-8-16	8,882	3,765	.06	.02
0-10-30	35,324	45,006	.23	.30	6-8-24	6,866	5,834	.04	.04
0-10-45	2,795	3,749	.02	.02	6-8-36	13,838	11,053	.09	.07
0-12-12	123,861	86,345	.80	.45	6-8-48	8,177	9,271	.05	.06
0-12-16	3,280	2,748	.02	.02	6-8-12	70,860	84,509	.46	.54
0-12-20	26,679	20,121	.17	.13	6-9-27	2,308	3,035	.02	.02
0-12-24	3,037	2,978	.02	.02	6-10-4	69,795	57,216	.39	.37
0-12-36	6,078	6,854	.04	.06	6-12-4	3,643	3,383	.02	.02
0-14-6	3,862	4,811	.03	.03	6-12-6	53,809	51,806	.35	.34
0-14-7	76,332	32,590	.49	.21	6-12-12	166,226	185,274	1.08	1.21
0-14-10	25,786	8,800	.17	.05	6-12-18	3,976	4,223	.03	.03
0-14-14	208,386	177,499	1.72	1.15	6-20-20	2,348	4,532	.02	.03
0-15-15	31,868	11,632	.21	.08	6-24-0	30,628	21,536	.20	.14
0-18-30	12,976	17,899	.08	.12	6-24-12	22,808	43,087	.15	.28
0-18-8	9,808	12,881	.06	.08	6-24-24	8,316	13,336	.04	.09
0-20-10	28,770	22,906	.19	.15	7-0-11	0	5,037	.00	.03
0-20-20	306,125	343,182	1.97	2.25	7-5-7	2,078	2,690	.02	.02
0-20-15	3,828	5,525	.02	.04	7-5-9	0	3,418	.00	.02
0-20-30	6,532	11,085	.04	.07	7-7-7	36,202	36,428	.25	.24
2-10-6	7,727	8,044	.05	.05	7-7-10	81	4,199	(2/)	.03
2-12-6	150,278	81,084	1.01	.53	7-8-9	1,148	3,182	.01	.02
2-12-12	409,203	404,036	2.65	2.66	7-9-9	3,911	2,846	.03	.02
3-8-6	6,442	4,302	.04	.03	8-0-8	13,061	16,384	.08	.11
3-8-9	16,886	12,745	.11	.08	8-0-12	10,127	6,825	.07	.04
3-9-6	671,216	608,286	4.34	3.99	8-0-24	18,541	20,088	.12	.13
3-9-9	455,690	499,239	2.98	3.21	8-4-4	2,978	2,846	.02	.02
3-9-12	38,079	28,981	.25	.19	8-4-8	11,438	37,279	.07	.24
3-9-18	7,081	9,258	.05	.06	8-6-4	6,138	6,463	.03	.04
3-9-18	184,685	113,702	1.00	.73	8-6-6	4,931	3,539	.03	.02
3-9-27	118,009	123,964	.76	.81	8-6-8	7,722	7,845	.06	.06
3-10-8	5,088	2,698	.03	.02	8-8-4	21,060	20,037	.14	.13
3-10-12	7,787	8,209	.06	.06	8-8-8	342,242	254,471	2.21	1.67
3-12-6	478,676	378,396	3.10	2.52	8-8-10	4,897	5,876	.03	.04
3-12-8	1,242	3,920	.01	.03	8-10-12	15,861	11,742	.09	.08
3-12-12	2,241,287	1,780,944	14.50	11.84	8-12-12	15,747	27,835	.10	.18
3-18-9	114,815	72,765	.74	.48	8-12-16	34,869	17,021	.23	.11
4-6-6	6,126	6,201	.04	.04	8-16-8	7,853	7,062	.05	.05
4-6-8	17,290	15,888	.11	.10	8-16-16	67,434	94,782	.44	.62
4-8-8	61,287	48,399	.33	.32	8-24-8	106,141	121,805	.69	.86
4-7-5	130,603	130,830	.85	.85	8-24-12	789	6,683	(2/)	.04
4-8-4	17,736	15,987	.09	.09	8-32-0	63,876	72,178	.38	.47
4-8-6	491,178	320,699	3.11	2.10	9-6-6	8,632	6,921	.04	.05
4-8-8	330,422	393,334	2.14	2.58	9-9-12	2,308	3,803	.01	.02
4-8-10	83,485	87,500	.41	.57	9418-0	4,066	4,760	.03	.03
4-8-12	78,761	51,841	.51	.34	9-36-0	1,256	2,522	.01	.02
4-8-3	77,400	76,442	.50	.50	10-0-10	34,396	44,797	.22	.29
4-10-6	861,802	498,719	5.76	3.27	10-0-12	1,953	2,529	.01	.02
4-10-7	527,099	552,415	3.41	3.62	10-4-10	3,213	5,287	.02	.04
4-10-8	5,810	6,334	.04	.04	10-6-6	3,151	2,589	.02	.02
4-10-10	9,636	9,513	.06	.06	10-6-4	38,674	35,258	.25	.23
4-12-4	192,110	142,517	1.24	.93	10-10-0	10,387	8,007	.12	.05
4-12-6	7,346	2,883	.05	.02	10-10-6	37,659	30,971	.24	.20
4-12-8	160,948	152,806	1.04	1.00	10-10-10	401,079	701,286	2.60	4.60
4-12-12	206,880	370,034	1.32	2.43	10-12-10	4,618	3,840	.03	.03
4-12-16	3,130	2,851	.02	.02	10-15-15	5,887	2,882	.04	.02
4-12-24	1,736	3,130	.01	.02	10-16-8	10,668	9,948	.07	.07
4-16-0	25,882	11,996	.17	.08	10-20-0	121,300	117,049	.78	.77
4-16-8	71,295	52,456	.46	.34	10-20-10	25,235	48,734	.16	.32
4-16-16	473,321	698,177	3.06	4.58	10-20-20	2,800	9,088	.02	.06
4-24-12	91,371	55,070	.53	.36	10-30-10	6,391	3,824	.04	.02
5-3-4	2,805	3,640	.02	.02	12-0-12	12,884	14,145	.08	.09
5-3-6	1,684	2,564	.01	.02	12-0-12	10,807	5,148	.07	.03
5-4-8	7,661	5,808	.05	.04	12-6-6	4,449	5,883	.03	.02
5-5-10	1,246	2,538	.01	.02	12-8-8	2,820	3,837	.02	.03
5-6-6	1,487	2,702	.01	.02	12-12-6	3,289	3,768	.02	.02
5-6-8	7,782	7,363	.05	.05	12-12-12	73,072	208,922	.47	1.37
5-7-5	25,977	24,068	.17	.16	12-24-0	8,860	11,745	.06	.08
5-7-10	5,141	3,726	.03	.02	12-24-12	36,891	31,364	.24	.21
5-8-7	18,922	16,840	.15	.11	13-13-13	16,788	24,184	.10	.16
5-8-8	4,282	4,282	.03	.03	14-0-14	30,809	38,892	.20	.25
5-10-6	877,240	821,118	5.68	5.38	14-14-0	8,008	8,286	.05	.05
5-10-10	1,115,741	1,287,746	7.22	8.44	14-14-14	0	2,852	.00	.02
5-10-15	33,231	80,404	.22	.55	15-0-12	3,076	4,437	.02	.03
5-10-16	16,318	5,933	.11	.04	16-8-8	14,483	8,461	.09	.06
5-10-20	3,789	7,819	.02	.05	16-16-0	32,404	28,402	.21	.18
5-15-10	22,851	10,040	.15	.07	16-20-0	2,764	2,874	.02	.02
5-15-15	4,084	17,334	.03	.11	16-20-0	0	6,868	.00	.04
5-15-30	4,023	4,747	.03	.03	17-7-0	32,307	19,706	.21	.13
5-20-10	17,117	44,710	.11	.29	19-19-0	0	3,560	.00	.02
5-20-20	87,676	300,908	.57	1.97	20-0-20	1,139	4,447	.01	.03
6-2-6	22,467	26,182	.14	.17					
6-4-6	8,053	11,067	.05	.07	176 Grades	15,008,790	14,853,606	97.12	97.35
6-4-8	14,548	21,204	.09	.14	Other specified grades[3]	316,489	280,907	2.05	1.84
6-6-6	79,320	81,087	.52	.53	Grades not shown[4]	128,665	123,540	.83	.81
6-6-8	16,968	14,189	.07	.09					
6-6-12	5,283	11,689	.03	.08					
6-6-18	9,729	11,874	.06	.08					
6-7-7	8,224	5,672	.05	.04					
6-8-2	2,276	3,929	.01	.03					
6-8-4	218,173	168,852	1.39	1.11	Total[5]	15,453,952	15,258,053	100.00	100.00

1/ The tonnages of 48 grades were increased by amounts originally reported as "other specified grades." Their combined amount of increase was 12,194 tons. 2/ Less than 0.01 percent. 3/ There were approximately 1,149 in 1952-53 and 1,044 in 1953-54. 4/ There were, at least, 500 grades not shown by their guaranteed analysis. 5/ Does not include the quantity of mixtures consumed in the Territories.

Grade Consumption

Consumption of individual grades of mixtures in total quantities of 2,500 tons or more in the continental United States is shown in Table 2. In 1953-54, there were 176 of these grades totaling 14,853,606 tons and accounting for 97.35 per cent of the total quantity of mixtures consumed. Other reported grades numbered 1,044 and totaled 280,907 tons, and approximately 500 grades reported under unspecified designations totaled 123,540 tons.

Consumption of mixed fertilizers in Hawaii and Puerto Rico totaled 283,023 tons in 141 grades (all specified). While most of the grades in Puerto Rico are similar to those used on the continent, many of those in Hawaii are designated in fractional numbers.

Top Grade

The tonnages of the ten grades most favored in the continental United States are shown in Table 2a. The total tonnage of these grades accounted for 50 per cent or more of the total tonnage of mixtures consumed in the continental United States in both 1952–53 and 1953–54. Grades 3–12–12, 5–10–10 and 5–10–5 were the only ones of this group that retained the same relative position in both years. Grade 3–9–6 ranked fourth in 1952–53 but dropped to sixth place in 1953–54, being exceeded in tonnage by grades 10–10–10 and 4–16–16.

The tonnages of the 15 principal grades consumed in each of the continental regions and Puerta Rica in 1953-54 are shown in Table 3, together with the tonnages of these grades for each

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state in the region. The total tonnage of these 15 grades represents 55 per cent or more of the consumption of mixtures in each of the regions.

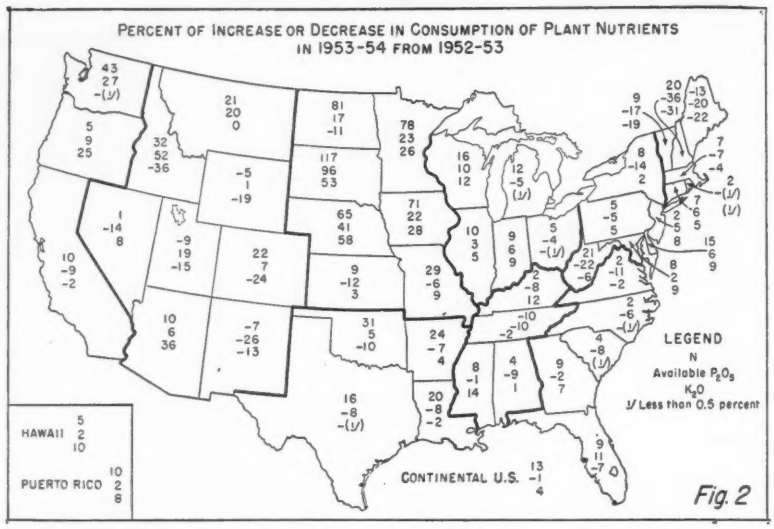
Among the individual states, the total number of specified grades ranged from 16 for Nevada to 782 for Florida. For California, the number originally reported was 599, but subsequent information from the state fertilizer control office indicates over 800; some 200 grades were originally included in the unspecified group.

Mixture Classes

The consumption of mixtures by classes ((N-P-K, N-P, P-K, N-K) for each region and the United States is shown in Table 5. Except for the Mountain region, N-P-K mixtures were favored over all other classes. More than 73 per cent of the tonnage of all mixtures consumed in each of the other regions was of this class. N-P mixtures were consumed in largest tonnage in the Mountain region. For the United States, 90.40 per cent of the tonnage of all mixtures was of the N-P-K class, while for the other classes—N-P, P-K, N-K—consumption was 2.46 per cent, 5.76 per cent and 1.38 per cent of the total tonnage, respectively. These proportions have not changed greatly from year to year. Over the past several years, however, the proportions of the N-P and N-K classes have steadily increased; in 1949–50, they were 1.45 and 0.60 per cent, respectively.

Weighted Averages

The national weighted average primary nutrient content of mixed fertilizers increased from 25.84 per cent in 1952–53 to 26.87 per cent in 1953–54 (Table 7). The average, for 1953–54, comprised nitrogen, 5.01; available P_2O_5, 11.59 and K_2O, 10.27 per cent. The average percentages of these nutrients in 1952–53 were 4.63, 11.34 and 9.87, respectively. As compared with 1952–53, the increase in the average was 8.21 per cent for nitrogen, 2.20 per cent for available P_2O_5 and 4.05 per cent for K_2O. The average primary nutrient content of all mixtures consumed in each state and territory is shown in Table 7. These averages for the 51 political units covered showed for nitrogen increases in 44 and decreases in 7; for available P_2O_5, increases in 34 and decreases in 17; for K_2O, increases in 35 and decreases in 16 and for total primary nutrients, increases in 42 and decreases in 9.


PERCENT OF INCREASE OR DECREASE IN CONSUMPTION OF PLANT NUTRIENTS IN 1953-54 FROM 1952-53
LEGEND
N
Available P_2O_5
K_2O
1/ Less than 0.5 percent
HAWAII 5 2 10
PUERTO RICO 10 2 8
CONTINENTAL U.S. 13 -1 4
Fig. 2

Materials

The consumption of fertilizer materials for direct application amounted to 7,232,423 tons in 1953–54 as compared with 7,690,384 tons in 1952–53. The quantity, in 1953-54, comprised chemical nitrogen materials 3,260,403 tons, phosphate materials (including ammonium phosphates) 2,544,886 tons, natural organics 420,068 tons, potash materials (including nitrate of potash, nitrate of soda-potash and lime-potash (391,553 tons and secondary and trace element materials 615,513 tons. Compared with 1952–53 there was an increase of 273,104 tons in chemical nitrogen materials, 61,031 tons in natural organics and 34,627 tons in potash materials. Decreases of 564,749 tons and 261,974 tons were shown in phosphate materials and secondary and trace element materials, respectively. The consumption of the principal materials comprising these classes is shown by states and regions in Tables 4 and 5.

Nitrogen

In chemical nitrogen materials the principal changes from the previous year were increases in anhydrous ammonia (from 217,182 to 350,474 tons), nitrogen solutions including aqua ammonia (from 72,917 to 191,592 tons) and ammonium nitrate (from 846,252 to 924,-716 tons). Among the natural organics, the consumption of dried manures increased from 207,127 to 259,868 tons.

Phosphates

Of the phosphate materials, the consumption of ammonium phosphates (11–48 and 16–20 grades) increased from 226,222 to 275,931 tons, while decreases were shown for basic slag (301,537 to 195,270 tons), phosphate rock (1,176,962 to 912,676 tons), and superphosphates grading 22 per cent and under (1,046,827 to 786,927 tons). The total quantity of phosphate rock used in Illinois and Missouri, the two largest consuming states, was 722,520 tons in 1953–54, compared with 954,491 tons in 1952–53. The consumption of superphosphates grading 22 per cent and under was below that in 1952–53 in 42 of the 51 states and other political units; total consumption of these grades

TABLE 2a. Ten Principal Grades of Mixed Fertilizers Consumed in Continental United States, Years Ended June 30, 1953 and 1954

Grade	Consumption		Proportion of Total Consumption of Mixed Fertilizers in Continental U. S.	
	1952-53	1953-54	1952-53	1953-54
	Tons	Tons	Per Cent	Per Cent
3-12-12	2,241,137	1,730,944	14.50	11.34
5-10-10	1,115,741	1,287,746	7.22	8.44
5-10-5	877,240	821,116	5.68	5.38
10-10-10	401,079	701,365	2.60	4.60
4-16-16	473,321	698,177	3.06	4.58
3-9-6	671,216	608,256	4.34	3.99
4-10-7	527,094	552,416	3.41	3.62
4-10-6	581,802	498,719	3.76	3.27
3-9-9	455,699	489,239	2.95	3.21
2-12-12	409,203	404,036	2.65	2.65
Total	7,753,532	7,792,014	50.17	51.08

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amounted to only 42.38 per cent of that in 1949–50.

Potash

The 60-per cent grade of potassium chloride was greatly favored over the 50-per cent grade; the respective consumptions of these grades were 256,979 and 53,056 tons, as compared with 172,210 and 110,255 tons in 1952–53.

The total consumption of gypsum decreased from 837,422 tons in 1952–53 to 576,780 tons in 1953–54. The consumption in California alone decreased from 719,788 to 414,067 tons.

The weighted average primary nutrient content of the principal classes of materials consumed is given in Table 7. These averages are based on the composition and tonnage of the individual materials comprising the several classes. For materials containing only nitrogen, P_2O_5 or K_2O, the respective national averages were 30.81, 15.70 (available P_2O_5) and 54.01 per cent, while the multiple-nutrient materials averaged 17.53 per cent. The corresponding averages for these classes in 1952–53 were 28.54, 14.48, 51.89 and 21.96 per cent. With the exception of the multiple-nutrient materials, the national averages were higher than in 1952–53. This reflects the greater use of higher analysis products. The drop in the average concentration of multiple-nutrient materials was largely the result of the increase in consumption of dried manures, which have a low content of primary nutrients.

Table 3. - Consumption of Mixed Fertilizers, by Grades in Each State and Region, Year Ended June 30, 1954[1]

State	Fifteen Principal Grades Consumed in Regions, Tons															All Other Grades		Total Tons
																Number[2]	Tons	
New England																		
	5-10-10	6-8-12	8-12-12	4-8-6	8-16-16	8-12-16	4-8-7	7-7-7	10-10-10	0-16-20	5-10-5	6-8-8	8-8-10	0-14-14	4-8-8			
Maine	21,048	53,990	24,818	---	6,263	16,824	5,617	2,983	2,921	66	847	8,280	5,078	3,302	---	45	14,558	166,750
New Hampshire	5,838	---	255	---	1,881	14	914	889	915	841	141	---	---	185	---	24	1,956	11,828
Vermont	6,975	---	81	---	5,067	36	280	800	1,979	2,312	580	---	---	323	6	39	3,477	27,564
Massachusetts	17,018	---	---	5,715	4,002	77	6,998	5,999	4,099	421	6,304	---	---	790	1,206	27	14,497	69,116
Rhode Island	6,673	---	975	---	193	4	965	839	279	97	784	---	---	109	163	31	2,924	13,456
Connecticut	10,844	---	1,080	16,704	2,179	44	4,184	3,180	2,452	1,828	5,896	---	---	925	4,060	81	14,038	68,208
Total	68,088	53,990	26,787	22,422	19,585	17,019	16,918	14,869	12,645	11,444	10,802	8,280	5,078	5,634	5,427	106	51,450	361,918
Middle Atlantic																		
	5-10-10	3-12-6	8-10-5	10-10-10	0-20-20	6-12-6	8-16-16	0-14-14	4-8-12	2-12-12	4-12-12	8-8-8	8-12-12	7-7-7	4-12-8			
New York	180,184	20,087	139,082	55,884	15,276	39,840	14,801	3,061	---	80	15	4,998	15,916	9,935	265	66	38,985	513,142
New Jersey	161,211	3,149	30,007	7,172	3,268	611	1,089	4,308	481	106	45	13,687	1,733	8,452	5,290	58	30,852	286,038
Pennsylvania	341,808	130,897	31,808	43,876	23,276	2,094	16,211	11,800	9,990	7,871	23,210	2,486	8,842	554	5,588	102	52,161	628,177
Delaware	44,066	3,732	2,483	4,894	1,552	---	4,237	3,499	3,117	4,252	1,283	434	1,369	287	873	51	12,407	88,773
District of Columbia	42	78	802	4	---	---	---	---	204	12	---	---	2	14	7	16	744	1,907
Maryland	82,066	65,717	28,225	12,018	3,991	---	2,343	9,551	19,194	16,070	5,974	5,094	1,861	1,966	4,028	68	38,139	292,025
West Virginia	21,786	16,837	4,349	2,898	4,067	---	237	2,918	---	1,710	99	10	835	2	4,488	38	8,216	67,851
Total	701,110	240,075	236,653	125,225	51,730	42,445	37,997	35,016	32,986	30,131	30,624	26,689	34,647	21,180	20,514	180	187,224	1,837,913
South Atlantic																		
	4-10-6	3-8-6	3-8-9	2-12-12	4-8-8	4-8-6	4-12-12	8-10-10	8-10-5	4-7-6	8-8-6	4-8-10	3-12-12	8-6-6	4-8-8			
Virginia	89	87,811	34,914	191,880	---	---	25	105,128	76,003	---	14,673	4,777	10	---	4,908	45	187,269	686,101
North Carolina	235,196	280,440	158,704	142,980	295	---	10	140,618	46,642	---	63,286	72,013	32	---	80,626	41	138,723	1,490,646
South Carolina	176,385	80,192	202,167	---	36,687	---	12,101	12,918	60,280	---	5,972	---	61,711	---	---	29	35,932	672,025
Georgia	435	9,273	86,228	30,992	230,656	278,898	289,838	10,680	6,345	1	39,306	---	2,796	42	5,836	118	109,079	1,102,706
Florida	617	36	6,800	2,825	80,666	41,832	7,128	4,654	6,287	130,829	6,199	10,669	2,297	80,387	12,077	767	668,463	1,071,530
Total	412,696	467,851	487,643	368,307	367,896	320,730	309,967	280,208	196,457	130,830	129,357	87,459	66,848	80,429	76,442	951	1,139,436	5,022,006
East North Central																		
	3-12-12	4-16-16	10-10-10	9-20-20	8-20-20	5-10-10	8-8-27	12-12-12	3-18-9	3-9-18	0-10-30	8-12-12	2-12-6	10-6-4	8-8-8			
Ohio	535,443	44,623	76,011	42,262	47,868	137,719	156	14,110	18,467	9,282	781	9,113	18,671	7,891	1,095	66	80,441	1,016,142
Indiana	362,033	256,936	140,088	88,212	46,438	13,421	51,869	16,345	10,622	14,278	13,155	3,916	3,616	1,281	5,279	60	27,542	1,024,100
Illinois	151,702	132,794	118,107	38,853	23,429	311	49,931	36,988	9,284	12,431	4,649	10,084	315	1,102	6,002	67	44,982	631,830
Michigan	228,344	112,912	54,870	28,702	26,965	12,234	2,359	18,777	36,877	10,814	3,799	2,974	5,265	4,865	508	57	22,301	544,715
Wisconsin	114,079	62,339	35,348	41,404	51,096	8	16,288	1,065	2,270	19,963	21,870	1,849	---	104	93	64	35,298	403,141
Total	1,391,601	619,604	402,224	239,233	196,134	163,689	100,673	87,173	71,460	66,778	43,924	27,976	22,784	15,203	14,974	186	302,534	3,621,184
West North Central																		
	10-10-10	5-20-20	3-12-12	8-24-8	10-20-0	12-12-12	4-16-16	8-32-0	4-12-4	0-20-20	15-15-0	8-8-8	6-24-12	5-20-10	6-24-12			
Minnesota	13,767	34,955	6,286	17	4,865	186	36,946	2,735	---	22,878	120	6	19,006	10,147	32,946	61	67,337	261,844
Iowa	49,387	80,647	32,629	3,804	39,327	15,998	24,070	26,872	619	8,697	9,710	882	828	31,234	2,103	104	117,298	420,864
Missouri	44,632	4,364	57,933	77,110	3,898	74,861	2,827	80	80,091	21,493	2,112	48,634	14,943	---	---	61	56,286	466,786
North Dakota	302	188	267	24	841	35	797	10,388	---	55	123	---	2,052	136	3,741	35	4,141	23,066
South Dakota	152	106	17	60	8,391	36	29	1,768	4	32	2,249	---	123	46	185	46	2,804	15,359
Nebraska	697	143	96	696	13,683	1,286	24	10,345	102	732	20,023	23	861	27	---	43	17,359	65,946
Kansas	2,275	49	1,219	16,994	27,436	767	112	10,121	6,201	466	18,496	460	689	2	---	38	14,394	99,870
Total	111,342	120,302	98,418	99,396	98,939	93,966	72,806	68,007	86,817	54,353	52,830	49,814	42,001	41,592	39,975	159	288,998	1,345,116
East South Central																		
	4-10-7	6-8-8	6-8-4	8-10-6	3-9-6	6-12-12	3-12-12	8-10-15	0-14-14	6-8-6	8-10-10	2-12-8	4-12-8	8-8-8	4-12-12			
Kentucky	---	1,438	---	4,460	29,810	8,149	66,188	68,802	2,266	55,474	28,730	45,489	41,741	10,706	886	64	92,836	452,773
Tennessee	1,429	5,582	2,933	4,410	90,533	104,944	30,055	3,081	627	1,961	18,462	8,567	8,704	8,822	2,112	70	104,671	396,132
Alabama	493,439	64,019	152,401	2,725	31	10	49	---	54,231	1,547	4	9	5	7,880	28,600	60	52,782	857,535
Mississippi	6,391	165,490	7,411	124,052	---	5	1,310	---	7,901	88	9,700	---	---	14,060	---	25	16,410	354,508
Total	500,958	236,529	163,445	137,647	120,374	113,108	97,582	71,883	64,924	58,890	56,896	54,065	50,450	40,967	32,598	181	246,700	2,059,948
West South Central																		
	5-10-5	8-8-8	4-12-4	3-12-12	6-8-12	10-20-10	0-14-7	12-12-12	12-24-12	3-5-18	6-8-8	13-13-13	8-10-10	10-20-0	3-9-27			
Arkansas	63,176	5,432	9,264	3,210	36,802	9,089	1,332	7,650	1,902	18,318	61	2,104	1,193	23	10,606	57	24,725	193,747
Louisiana	34,128	32,868	15,621	23,942	607	2,014	1,802	12,980	3,059	146	14,736	4,368	4,060	31	7	37	25,236	170,962
Oklahoma	28,906	881	8,347	1,061	2	6,525	698	177	2,761	1,229	---	314	1,877	4,580	---	30	9,607	66,514
Texas	113,085	25,198	16,231	10,908	510	11,279	20,149	2,917	15,136	62	116	6,034	5,172	6,736	---	94	49,864	281,367
Total	237,295	64,379	47,463	39,109	37,421	28,907	23,981	23,824	20,240	19,784	14,915	12,820	11,682	11,440	10,613	158	109,642	713,090
Mountain																		
	10-20-0	12-24-0	10-10-0	8-10-4	10-10-10	15-11-0	10-16-8	10-20-5	20-10-0	8-30-0	10-18-6	14-14-7	14-7-0	10-35-0	10-12-8			
Montana	2,803	---	---	225	---	---	1	---	---	790	268	---	---	---	---	19	347	4,234
Idaho	835	---	1,313	68	2	2,047	1,062	---	---	268	287	---	---	---	---	29	1,023	6,746
Wyoming	371	480	---	28	---	---	---	---	---	10	94	854	---	740	---	13	419	2,279
Colorado	745	7,197	---	199	618	---	277	---	---	177	562	36	---	114	809	51	3,488	14,690
New Mexico	370	---	31	66	7	---	---	---	---	---	---	---	296	---	---	18	1,377	2,147
Arizona	5,382	---	4,254	---	1,485	---	---	2,017	1,624	---	---	735	628	---	---	48	7,339	21,462
Utah	888	---	113	1,498	28	14	9	---	---	317	62	---	---	---	---	30	692	3,651
Nevada	123	---	---	427	---	---	---	---	---	---	---	87	---	---	---	15	196	873
Total	9,117	7,677	5,711	2,547	2,139	2,061	2,049	2,017	1,642	1,562	1,073	1,112	924	864	809	124	14,889	56,152
Pacific																		
	10-10-6	17-7-0	8-8-4	6-10-4	8-10-12	10-10-10	15-7-4	10-16-8	8-10-10	6-8-6	16-10-0	4-10-10	6-20-20	10-12-10	10-20-20			
Washington	598	4	---	4,522	---	1,132	---	237	5,439	---	---	---	2,831	---	2,473	84	12,494	29,630
Oregon	156	15	2	1,042	---	538	362	7,597	1,507	---	---	---	1,709	---	1,227	54	7,644	21,979
California	27,318	19,267	18,454	6,094	10,205	8,023	7,894	66	94	6,869	5,810	5,264	11	3,772	2	594	102,322	221,244
Total	28,052	19,286	18,456	11,658	10,205	9,693	8,256	7,900	7,040	6,869	5,810	5,264	4,551	3,772	3,702	600	122,460	272,873
Territories[3]																		
	14-2-2	12-6-10	14-4-10	15-4-7	12-4-10	12-3-12	6-8-10	10-10-8	8-8-10	10-6-14	9-10-8	12-1-16	18-10-6	16-4-5	12-2-10			
Puerto Rico	32,916	22,644	22,681	21,863	17,393	16,124	14,085	12,925	9,820	6,854	6,133	5,116	4,820	4,734	4,820	35	34,251	223,359

1/ Dashes indicate quantity of grade, if used, was less than 0.5 tons.
2/ The number of mixtures shown for each State and Region is exclusive of mixtures not specified by grade, although their tonnages are included in the totals.
3/ The total consumption in Hawaii was 59,184 tons of mixed goods, comprising 101 grades, which were manufactured to consumer's specifications. Data for Alaska not available. In 1952-53, the number of mixtures reported were nine, totaling 136 tons.

Primary Nutrients

The quantities of primary nutrients in fertilizers are based on the average analyses of the various products as published by fertilizer control officials for the state in which they were consumed, rather than on the manufacturers' guarantees. Thus, the overruns or underruns of nutrients from the guarantees are taken into account. This gives more nearly the actual tonnages of nutrients than would be the case if only the guarantees were used. The actual nutrient content usually averages somewhat higher than the guarantee.

Fertilizers consumed in the United States and territories in 1953–54 contained 1,847,416 tons of nitrogen, 2,242,100 tons of available P_2O_5 (2,646,971 tons of total P_2O_5) and 1,806,042 tons of K_2O (Table 6). Compared with 1952–53, the quantity of nitrogen increased 210,360 tons (12.85 per cent) and of K_2O 67,792 tons (3.90 per cent), while available P_2O_5 and total P_2O_5 decreased 28,650 tons (1.26 per cent) and 118,317 tons (4.28 per cent), respectively.

Nutrient Trends

The annual consumption of primary nutrients in the United States and territories for the years 1943–44 to 1953–54 is shown in Figure 1. During the period 1945–46 to 1949–50 the consumption of nitrogen increased at the rate of approximately 75,000 tons annually whereas the annual rate of increase in subsequent years was about 210,000. In general, the consumption of K_2O has paralleled that of nitrogen, but with a decreasing trend in the annual rate of increase since 1950–51. It will be noted that in 1953–54 the consumption of K_2O was lower than that of nitrogen for the first time during the period 1943–44 to 1953–54. Also for the first time during this period, the

Table 4. – Principal Fertilizer Materials Consumed as Such, Year Ended June 30, 1954[1]

Tons

State & Region	Chemical Nitrogen Materials					Natural Organics		Phosphate Materials				Potash Materials		Total Primary Nutrient Materials	Secondary and Trace Element Materials[2]
									Superphosphates						
	Ammonium Nitrate	Ammonium Sulfate	Calcium Cyanamide	Sodium Nitrate	Other[2]	Dried Manures	Other[2]	Phosphate Rock[3]	Grades 22 Percent and Under	Grades Over 22 Percent	Other[2]	Chlorides 50 & 60 Percent Grades	Other[2]		
Maine	1,237	78	264	281	23	412	247	25	4,203	0	140	24	20	6,954	78
New Hampshire	939	28	49	125	58	165	420	34	2,007	0	67	64	20	3,976	11
Vermont	407	2	6	165	168	62	84	80	9,604	0	35	216	17	10,647	30
Massachusetts	1,144	57	205	1,195	141	1,862	5,765	319	3,809	0	778	486	0	15,763	139
Rhode Island	79	67	122	129	23	209	739	49	334	0	142	76	3	1,992	19
Connecticut	584	36	92	726	86	1,406	13,847	106	4,438	39	1,058	1,075	1,271	24,764	289
New England	4,390	288	738	2,622	499	4,116	21,102	613	24,395	39	2,220	1,943	1,331	64,296	546
New York	14,419	389	2,605	5,787	2,366	3,242	9,758	1,276	52,730	161	1,221	913	501	95,358	945
New Jersey	2,390	168	1,932	2,880	1,728	2,710	3,194	1,241	5,709	174	1,037	1,406	144	24,711	259
Pennsylvania	4,355	2,673	1,552	1,798	1,609	2,940	6,713	7,562	36,908	31	3,108	876	107	70,232	2,538
Delaware	2,124	24	246	167	1,738	135	209	106	728	80	100	296	36	5,988	120
District of Columbia	9	4	0	64	5	114	388	0	28	40	133	3	0	788	3
Maryland	1,472	114	1,256	3,662	1,762	731	579	1,677	6,239	12	466	285	1,999	20,233	286
West Virginia	766	392	9	1,767	364	399	672	466	4,292	46	79	57	1	9,299	33
Middle Atlantic	25,536	3,762	7,600	16,116	9,572	10,271	21,513	12,327	106,634	534	6,143	3,816	2,787	226,609	4,163
Virginia	5,237	124	1,440	30,300	27,681	659	1,022	3,427	9,977	301	1,145	1,605	14,681	97,499	16,463
North Carolina	15,091	346	8,673	141,248	115,469	360	1,697	1,995	17,595	89	10,044	10,380	10,624	333,791	24,782
South Carolina	24,841	679	1,529	99,154	85,780	405	798	1,512	20,247	3	8,396	19,066	3,944	266,384	2,744
Georgia	26,426	1,177	1,930	93,618	72,499	899	745	770	16,688	277	16,812	10,496	3,388	244,895	21,433
Florida	10,048	4,008	2,267	17,028	22,174	734	6,728	13,593	7,843	140	5,338	2,806	17,688	110,185	2,966
South Atlantic	81,642	6,334	16,029	381,548	325,603	3,057	10,990	21,297	72,150	810	40,736	44,333	50,295	1,052,724	68,388
Ohio	13,667	7,658	1,473	1,122	10,398	1,179	6,999	9,874	15,389	3,820	676	2,276	1,287	76,507	519
Indiana	46,919	6,611	2,415	270	27,723	1,045	1,478	27,012	17,141	5,655	590	19,972	412	156,141	487
Illinois	36,942	36,037	1,300	117	46,555	4,657	7,184	563,876	64,420	12,067	6,303	93,153	251	273,862	785
Michigan	13,000	6,498	311	664	4,314	2,973	5,670	3,507	11,761	361	595	1,193	563	54,310	651
Wisconsin	8,652	164	84	0	2,552	952	6,034	12,836	2,810	135	103	3,943	572	38,827	235
East North Central	118,200	55,858	5,583	2,173	91,542	10,806	30,263	617,105	111,521	21,738	10,267	120,536	3,085	1,198,647	2,857
Minnesota	13,249	1,046	35	6	10,744	525	3,408	5,120	10,796	17,673	6,959	1,346	0	70,907	324
Iowa	49,140	4,907	284	0	47,423	147	3,218	23,423	52,272	10,670	32,632	6,739	369	231,222	72
Missouri	44,004	9,249	20	246	35,826	990	2,331	156,644	8,387	4,940	5,023	18,811	1,279	287,750	135
North Dakota	425	70	0	0	85	0	31	40	90	14,919	8,925	14	0	24,599	20
South Dakota	3,103	405	3	7	1,835	0	104	161	1,841	4,997	4,139	13	2	16,608	0
Nebraska	40,754	4,045	0	0	47,302	1,761	909	4,953	4,498	17,052	11,182	126	0	132,584	586
Kansas	26,826	5,943	0	0	11,608	291	1,321	7,908	3,856	23,933	35,047	776	0	116,209	110
West North Central	176,801	25,665	342	259	152,823	3,714	11,320	200,249	81,440	94,184	103,907	27,827	1,650	879,879	1,247
Kentucky	29,706	1,272	1,659	2,221	3,956	320	219	8,133	46,655	4,200	12,133	8,916	9,315	128,704	106
Tennessee	37,049	370	1,084	18,745	9,316	752	751	624	20,098	6,303	18,036	10,369	5,101	128,670	392
Alabama	52,802	1,280	834	98,370	46,660	467	200	3,415	39,851	437	89,930	10,956	130	344,912	1,049
Mississippi	113,997	6,530	11,545	60,283	58,336	19	0	6,783	37,938	1,473	60,563	22,531	208	380,295	25
East South Central	233,553	9,452	15,092	179,619	118,269	1,558	1,170	18,955	144,322	12,413	180,662	52,772	14,754	982,481	1,572
Arkansas	39,150	10,859	12,055	32,086	23,546	49	0	2,580	16,609	4,570	3,209	31,179	983	176,874	6
Louisiana	28,468	11,229	1,081	34,144	28,464	156	413	3,230	16,063	1,406	12,829	6,739	75	144,292	512
Oklahoma	11,589	2,471	0	413	2,029	701	449	14,106	32,446	6,319	8,369	1,474	20	80,376	100
Texas	33,532	40,673	1,925	2,875	29,854	2,229	3,351	18,246	74,868	17,827	50,633	1,269	21	276,983	2,625
West South Central	112,754	65,232	15,041	69,218	83,972	3,135	4,213	38,162	139,986	30,122	75,030	40,661	1,099	678,525	3,243
Montana	8,260	2,738	0	0	0	20	0	0	10	15,354	2,795	10	0	24,184	684
Idaho	13,754	19,227	672	0	1,677	68	30	0	12,664	18,475	11,118	86	2	77,670	5,538
Wyoming	1,069	457	0	0	389	3	44	0	315	4,764	741	0	0	7,772	1,081
Colorado	5,493	2,168	0	0	3,775	426	661	200	1,653	14,043	3,141	170	65	31,785	1,299
New Mexico	1,466	706	0	1	3,473	33	682	0	4,891	4,938	4,010	0	0	20,200	16
Arizona	13,490	25,037	678	969	36,915	1,539	623	40	4,868	4,110	23,935	36	658	112,898	20,941
Utah	4,467	9,085	0	0	1,076	207	221	0	4,031	4,854	1,484	38	0	24,483	315
Nevada	148	405	0	12	286	29	106	0	184	544	884	3	0	2,841	5,741
Mountain	48,167	58,810	1,250	982	47,591	2,325	2,367	240	28,586	69,072	48,076	342	725	301,833	36,512
Washington	32,667	32,334	319	204	21,220	452	2,121	850	8,595	7,678	16,377	2,431	134	126,272	46,369
Oregon	23,558	36,760	698	0	10,066	425	671	280	11,774	2,856	22,125	1,436	74	110,723	14,698
California	71,079	172,230	5,521	243	187,283	4/ 220,000	54,399	1,604	51,948	11,915	86,393	1,300	4,269	867,874	436,828
Pacific	127,194	241,324	6,538	447	218,569	220,877	57,191	2,734	72,317	22,449	124,895	5,167	4,467	1,105,369	497,895
Continental U. S.	924,736	466,823	68,213	652,983	1,046,240	259,859	160,129	911,682	781,351	247,061	591,926	297,397	80,143	6,488,563	615,423
Hawaii	0	30,528	0	122	24,533	9	70	994	5,226	40	5,474	12,178	1,620	80,794	90
Puerto Rico	0	39,365	0	0	6,860	0	1	0	350	41	741	180	35	47,553	0
Alaska[5]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Territories	0	69,893	0	122	31,393	9	71	994	5,576	81	6,215	12,358	1,655	128,347	90
Total: 1953–54	924,736	536,716	68,213	653,106	1,077,633	259,868	160,200	912,676	786,927	247,142	598,141	309,755	81,818	6,616,910	615,513
1952–53	846,252	534,749	62,219	647,483	876,596	207,127	151,910	1,176,982	1,046,827	248,860	636,926	282,468	74,481	6,012,897	677,487
1951–52	799,189	486,617	42,284	681,761	572,903	196,726	145,089	1,160,020	1,224,290	225,089	704,787	246,576	73,548	6,561,019	786,060

1/ Includes materials distributed by Government agencies. Excludes lime and materials used by manufacturers in the formulation of commercial mixtures.
2/ The principal commodities are shown in Table 5, by regions.
3/ Includes colloidal phosphate, the quantity of which is shown separately, by regions, in Table 5.
4/ Estimated.
5/ Not available.

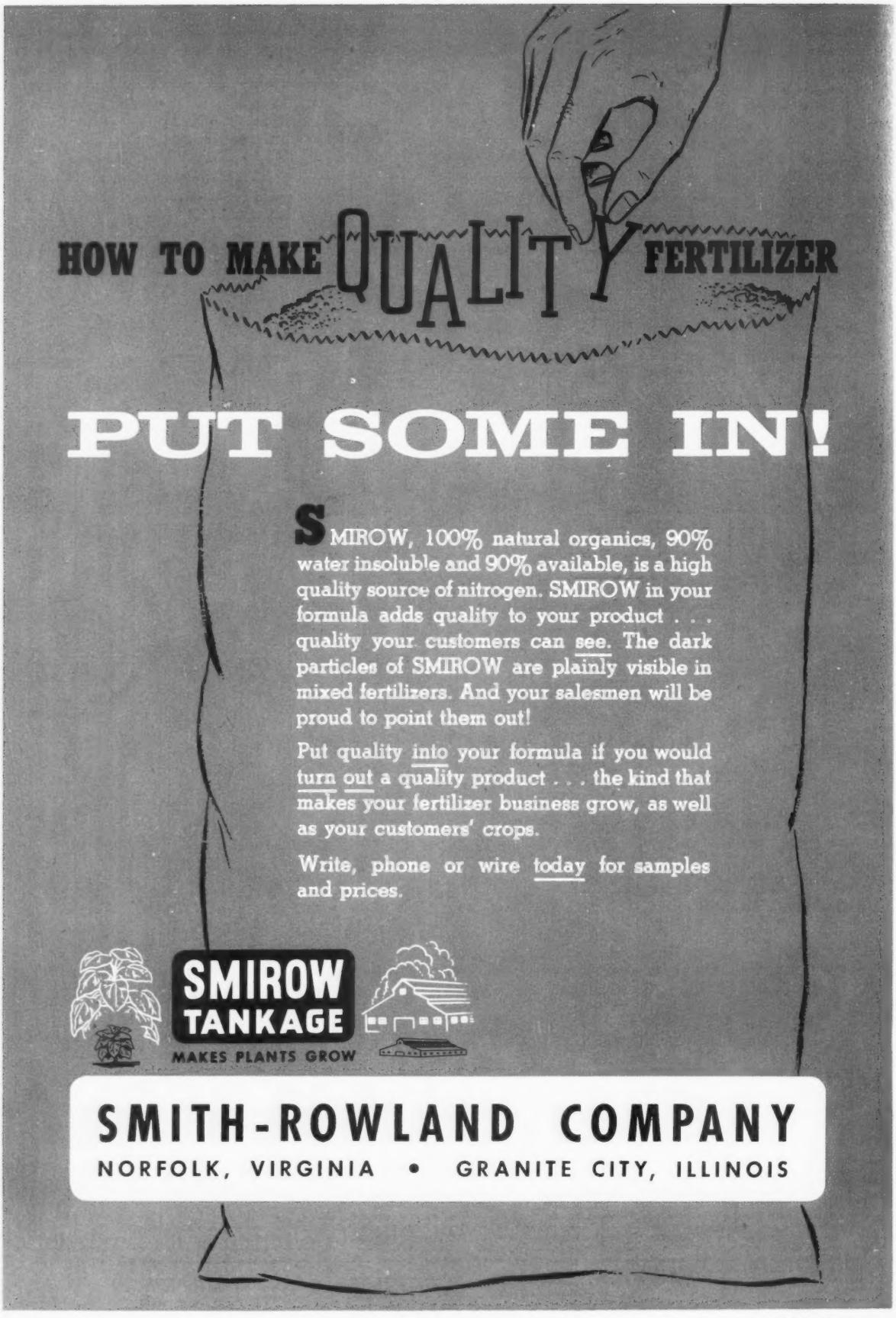
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Table 6. - Kinds of Fertilizers Consumed in Regions of the United States, in Tons, During Year Ended June 30, 1954[1]

Kinds	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Territories [2]	Total
MIXTURES: N-P-K	326,887	1,738,122	4,631,903	3,315,152	890,949	1,098,356	646,256	21,744	228,960	261,066	14,049,649
N-P	94	92	1,989	2,442	271,241	72	29,092	34,648	39,785	3,517	382,992
P-K	25,225	104,695	194,194	302,825	80,824	143,936	38,806	79	2,162	3,293	896,814
N-K	0	44	195,530	715	102	401	177	23	1,940	16,216	215,451
CHEMICAL NITROGEN MATERIALS											
Ammonia, anhydrous	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	350,474
Ammonium nitrate	4,390	26,535	81,642	118,200	176,601	255,353	111,754	45,147	127,194	0	924,716
Ammonium nitrate-limestone mixtures	170	53,314	291,066	17,664	14,740	60,229	2,661	52	80	0	390,003
Ammonium sulfate	286	3,762	6,334	55,858	25,663	9,552	65,252	50,830	241,324	69,892	536,736
Calcium cyanamide	736	7,600	16,029	5,583	342	15,092	18,041	1,260	6,558	0	69,212
Calcium nitrate	0	0	12,561	37	40	219	0	4,647	33,297	103	50,904
Nitrogen solutions [4]	0	2,116	5,083	13,132	34,193	696	4,390	14,199	98,976	21,918	6/ 194,693
Sodium nitrate	2,622	16,116	281,548	2,173	259	179,615	69,218	982	447	122	553,105
Other [5]	329	4,122	15,003	60,909	103,850	67,252	78,997	28,705	69,214	9,874	7/ 94,270
NATURAL ORGANIC MATERIALS											
Blood, dried	0	148	80	0	0	0	0	18	1,556	0	1,776
Castor pomace	5,039	70	2,998	0	0	0	0	66	1,494	0	9,666
Compost	85	4,388	1,131	235	4,199	0	1,982	0	3	0	11,992
Cottonseed meal [8]	7,880	61	1,852	2	0	0	0	2	0	1	9,806
Fish scrap, meal, and emulsions	431	2	0	0	0	0	0	1	1,060	0	1,494
Manures, dried	4,114	10,271	3,067	10,808	3,714	1,586	3,119	2,328	220,877	0	259,884
Sewage sludge, activated	6,418	9,955	3,001	26,09c	6,631	1,164	2,259	2,181	14,348	70	70,021
" " , other	0	0	0	1,136	591	0	0	0	29,017	0	30,843
Tankage, animal	0	161	19	0	0	0	0	0	311	0	491
" , garbage	0	12	9	0	0	0	0	0	0	0	21
" , process	2,398	6,817	2,069	2,701	0	6	0	0	492	0	14,503
Other [9]	854	2	320	0	0	0	0	78	8,826	0	10,177
PHOSPHATE MATERIALS											
Ammonium phosphates: 11-48	0	1	256	0	10,868	0	71	5,078	14,000	2,797	33,066
" " 16-20 [10]	0	18	69	098	56,896	87	60,647	34,172	67,527	2,856	242,865
" " 13-39	0	0	0	260	21,023	0	4,161	2,163	4,978	0	32,571
Ammoniated superphosphate [11]	0	0	72	0	0	0	0	929	6,661	741	8,393
Basic lime phosphate	0	0	958	0	0	2,748	0	0	0	0	3,706
Basic slag	0	2,000	32,401	0	0	161,268	8,611	0	0	0	198,270
Bonemeal, raw	246	360	271	97	61	28	116	7	972	0	2,162
" , steamed	1,804	3,677	1,134	1,362	1	419	844	1	1,016	0	9,857
Calcium metaphosphate	0	90	1,861	5,828	14,869	5,368	246	147	101	0	28,289
Fused tricalcium phosphate	0	0	1,455	1,822	33	20,718	204	0	0	0	24,242
Phosphoric acid: 52-54%	0	0	0	0	0	0	38	8,561	9,647	0	18,246
Phosphate rock	613	11,127	20,386	606,379	190,622	7,940	35,700	200	2,414	994	876,375
Colloidal phosphate	0	1,200	911	10,726	9,527	11,016	2,482	40	320	0	36,301
Precipitated bone	470	0	0	0	0	0	0	0	0	0	470
Superphosphate: 16%	4,729	15,974	40,867	34,102	17,882	33,472	208	3,307	30,076	0	180,617
" 19%	3,939	10	1,148	21	261	1,006	0	16,738	40,298	0	63,417
" 20-22%	18,727	90,660	30,137	77,398	63,246	109,344	139,776	6,544	1,943	8,576	540,993
" 20-41%	0	211	0	382	2,572	26	2,761	920	55	0	6,947
" 42-44%	0	0	0	0	25,563	0	0	35,899	10,168	0	71,320
" 45%	0	206	70	16,821	35,403	1,327	23,318	9,892	3,897	1	89,338
" 46%	0	29	260	1,774	23,799	412	16,951	5,454	8,960	80	41,008
" 47%	39	65	99	612	14,567	8,532	496	2,535	585	0	27,556
" 48%	0	0	361	1,746	1,840	1,143	786	77	1,260	0	7,222
" 49-50%	0	24	0	684	451	161	2,332	95	0	0	3,747
Other [12]	0	0	1,168	0	180	0	801	33	1	322	2,184
POTASH MATERIALS											
Cotton hull ashes	869	8	52	0	0	0	0	0	0	0	949
Lime-potash mixtures: 5-10 [13]	0	1,943	21,040	0	0	2,700	0	0	0	0	25,683
Manure salts: 20-30%	0	8	1,714	173	800	4	546	0	0	0	2,245
Potassium carbonate	0	0	184	0	0	0	0	0	0	0	184
Potassium chloride: 50%	34	187	21,208	6,667	1,798	11,369	10,051	31	993	800	53,066
" " 60%	1,909	3,622	23,127	113,969	26,329	41,383	30,810	311	4,174	11,538	256,979
" magnesium sulfate	146	243	3,299	1,971	648	982	491	0	8	3	7,961
" nitrate	198	7	0	0	0	0	0	0	0	0	195
" phosphate ash [13]	0	0	0	0	0	12	0	0	0	0	12
" sodium nitrate [11]	13	0	11,045	0	0	596	40	180	0	0	11,880
" sulfate	89	863	7,008	911	2	10,499	28	541	4,454	1,652	26,740
Tobacco stems	0	18	527	0	0	1	0	0	0	0	543
Wood ashes	0	0	5,456	0	0	0	0	0	0	0	5,456
TOTAL PRIMARY NUTRIENT FERTILIZERS	416,209	2,064,522	6,074,730	4,819,751	2,222,996	3,022,327	1,391,886	387,722	1,376,742	411,370	22,157,986
SECONDARY & TRACE ELEMENT MATERIALS [8]											
Aluminum sulfate	4	13	0	1	0	3	0	0	88	0	109
Borax	62	167	615	339	4	539	5	0	844	0	2,575
Calcium sulfate (gypsum)	406	3,241	66,186	1,965	1,241	967	1,200	29,204	472,471	0	579,780
Copper sulfate	0	56	170	166	0	2	0	2	154	0	550
Ferrous sulfate	0	0	19	2	0	0	0	64	517	0	602
Magnesium carbonate	0	0	0	0	0	0	0	0	6,122	0	6,122
" sulfate	19	186	1,041	83	0	0	0	6	119	14	1,379
Manganese sulfate	26	136	126	428	0	4	0	0	83	0	903
Mixed Minerals	0	144	111	3	0	8	21	79	2,717	0	2,981
Sulfur: 35-99.5%	10	140	122	28	0	1	2,017	5,414	13,489	0	19,221
Sulfuric acid: 60-93%	0	0	0	0	0	0	0	741	2,298	0	3,039
Zinc sulfate	0	28	80	2	0	31	0	2	1,992	76	2,231
TOTAL SECONDARY & TRACE ELEM. MAT.	546	4,161	68,368	2,867	1,247	1,572	3,243	30,512	497,895	90	615,513
TOTAL ALL FERTILIZERS	416,755	2,068,708	6,143,099	4,822,638	2,224,242	3,023,899	1,394,628	393,137	1,874,637	411,460	22,773,499

1/ Includes distribution by Government agencies. Does not include the quantities of materials used for manufacture of commercial mixtures.
2/ Excludes Alaska as data was not available. 3/ Included with "Other Chemical Nitrogen Materials." Regional data cannot be published without disclosing operations of individual suppliers. 4/ Includes aqua ammonia. 5/ Contains 26.63 percent nitrogen. 6/ Anhydrous ammonia, ammonium sulfate-nitrate, urea, and chemical nitrogen materials not classified. 7/ Does not include above total for anhydrous ammonia.
8/ Excludes materials distributed by other than manufacturers of fertilizers. 9/ Meals: Crab (2), Hoof and Horn (478), Linseed (683), Lupine (66), Seed (313), Soybean (212), Tung (196), Vegetable (98); Peat (23 [14]); and organics not classified 8,242 tons. 10/ Includes quantities reported as 16-20-0 mixture. 11/ Additional quantities may have been reported as mixed grades. 12/ Not classified. 13/ Includes cement flue dust. Additional quantities are given free to farmers for which no records are kept.

Table 6. - Consumption of Primary Plant Nutrients in Fertilizers, Year Ended June 30, 1964[1]

State & Region	TONS									
	In Mixtures					In All Fertilizers				
	Nitrogen	P_2O_5 Available	P_2O_5 Total	K_2O	Total N, Avail. P_2O_5, & K_2O	Nitrogen	P_2O_5 Available [2]	P_2O_5 Total [2]	K_2O	Total N, Avail. P_2O_5, & K_2O
Maine	11,046	17,876	18,846	20,397	49,319	11,620	18,472	19,306	20,636	50,728
New Hampshire	626	1,427	1,613	1,853	3,906	1,021	1,872	1,987	1,904	4,698
Vermont	1,191	3,985	3,793	4,923	9,809	1,414	5,740	6,064	5,089	12,243
Massachusetts	4,044	5,469	6,782	6,511	17,024	6,189	7,606	8,008	6,681	19,875
Rhode Island	736	1,340	1,419	1,356	3,432	889	1,466	1,864	1,410	3,767
Connecticut	3,764	5,678	6,041	6,209	15,651	5,110	7,394	7,963	7,862	20,366
New England	21,407	36,155	37,904	40,979	98,541	28,243	42,551	44,776	43,971	110,786
New York	29,265	57,828	60,410	46,812	133,603	37,290	69,196	72,896	47,411	163,997
New Jersey	14,027	27,751	29,172	26,604	68,382	16,745	29,530	31,126	27,675	73,680
Pennsylvania	28,378	72,700	75,879	62,683	163,761	32,046	81,256	86,564	63,387	176,661
Delaware	4,902	9,848	10,266	10,018	24,183	5,800	10,081	10,641	10,219	26,100
District of Columbia	110	182	196	123	415	164	282	288	189	635
Maryland	12,688	33,065	36,172	28,189	73,930	14,812	34,826	37,146	28,491	77,829
West Virginia	2,689	6,396	9,100	6,312	17,399	3,482	9,272	10,244	6,389	19,183
Middle Atlantic	91,469	209,765	219,894	180,439	481,653	110,299	234,016	248,906	183,841	527,956
Virginia	24,283	78,356	80,482	69,666	169,308	37,246	78,147	84,336	71,476	187,868
North Carolina	59,297	141,628	152,710	125,648	326,573	116,540	146,514	159,831	133,617	396,671
South Carolina	25,316	66,878	71,896	56,492	148,483	56,063	71,684	77,210	58,673	328,420
Georgia	44,965	104,990	113,426	99,678	249,328	88,500	110,421	119,377	106,374	305,295
Florida	58,780	83,118	87,586	78,916	219,815	72,575	84,869	106,834	82,936	240,280
South Atlantic	212,641	470,767	515,790	430,199	1,113,497	382,224	491,635	545,587	453,076	1,356,534
Ohio	41,641	150,336	139,652	129,078	321,056	63,325	156,607	147,766	130,573	319,905
Indiana	44,500	140,821	149,218	130,456	335,777	74,504	146,071	156,002	132,423	354,998
Illinois	32,913	84,799	90,297	84,466	212,178	82,186	124,109	131,965	121,965	326,260
Michigan	22,360	76,415	81,183	78,467	176,240	30,831	79,505	85,389	78,464	188,800
Wisconsin	14,517	56,816	62,200	69,213	142,246	19,736	89,785	67,086	71,803	181,294
East North Central	155,931	490,986	522,550	518,700	1,168,536	280,580	547,067	588,464	533,518	1,401,126
Minnesota	18,187	50,726	53,094	36,724	99,637	24,202	64,881	69,089	37,896	126,639
Iowa	28,764	78,396	79,621	61,865	148,645	78,119	102,398	112,932	68,825	224,042
Missouri	33,281	70,106	78,728	82,470	186,856	72,825	80,229	132,382	64,236	217,678
North Dakota	1,663	6,191	6,496	1,266	9,110	2,934	16,541	17,186	1,276	20,740
South Dakota	1,328	3,779	3,991	206	4,513	4,511	6,979	6,986	217	11,107
Nebraska	7,462	15,371	15,630	1,563	22,406	52,696	28,172	27,009	1,688	79,866
Kansas	9,719	20,244	21,431	2,496	33,458	23,262	41,890	45,752	2,979	79,131
West North Central	96,322	226,813	261,861	187,191	670,325	266,087	338,290	411,306	164,476	768,903
Kentucky	19,200	50,828	56,424	48,168	117,996	21,908	66,589	74,329	67,961	156,458
Tennessee	16,832	44,372	47,923	36,815	99,019	32,744	56,654	59,867	46,086	140,484
Alabama	36,282	84,499	91,206	83,745	183,526	80,834	101,709	110,923	70,285	262,828
Mississippi	20,334	33,797	36,423	26,795	80,924	112,299	48,370	53,988	39,536	200,406
East South Central	91,648	213,196	230,976	177,511	482,186	265,585	272,322	299,027	213,868	760,976
Arkansas	10,648	21,210	22,644	22,690	54,548	22,102	27,610	29,687	41,045	120,687
Louisiana	10,973	19,822	21,214	15,689	46,584	49,674	25,802	28,299	19,674	94,980
Oklahoma	4,156	9,568	9,568	5,888	17,392	11,414	21,418	22,744	4,788	37,649
Texas	17,786	38,174	37,044	18,771	71,700	85,689	70,161	77,942	19,623	186,434
West South Central	43,512	88,674	90,771	61,038	190,224	161,780	144,869	161,662	85,041	411,890
Montana	387	890	996	42	1,328	3,141	8,027	8,676	49	11,217
Idaho	701	926	986	136	1,763	18,494	14,998	16,070	191	27,681
Wyoming	267	584	612	44	895	1,097	5,011	5,092	44	4,152
Colorado	1,632	3,286	3,380	830	5,448	7,008	11,718	11,969	880	19,404
New Mexico	246	322	341	49	617	4,098	4,567	4,704	54	8,707
Arizona	2,666	3,241	3,365	627	6,494	32,496	12,338	12,641	986	46,788
Utah	800	870	898	107	1,777	4,080	5,960	6,085	154	9,674
Nevada	66	109	115	37	214	414	546	568	40	1,000
Mountain	6,197	9,227	10,361	1,672	17,706	65,313	89,164	91,855	2,148	186,624
Washington	2,087	3,944	4,089	3,187	9,168	26,243	13,704	14,297	4,708	54,654
Oregon	2,080	3,382	3,609	2,109	7,811	22,640	12,334	12,882	3,068	41,006
California	23,688	22,057	22,973	12,284	58,189	172,965	65,715	68,184	20,500	259,980
Pacific	27,915	29,383	30,671	17,580	74,868	234,848	91,753	95,339	28,087	364,628
Continental U. S.	745,012	1,784,854	1,911,197	1,644,989	4,084,806	1,769,886	2,221,946	2,426,291	1,766,676	5,779,510
Hawaii	6,180	5,288	5,784	9,334	20,782	20,964	8,324	9,160	17,513	46,901
Puerto Rico	26,907	11,680	13,809	21,739	60,326	26,564	11,830	13,520	21,855	70,247
Alaska [2]	---	---	---	---	---	---	---	---	---	---
Territories	33,087	16,969	19,593	31,073	81,049	47,528	20,154	22,680	39,368	117,068
Totals 1963-64	778,099	1,801,823	1,930,790	1,676,062	4,175,864	1,817,414	2,242,100	2,446,971	1,806,042	5,896,582
1962-63 [3]	728,086	1,732,286	1,850,672	1,662,041	4,062,422	1,627,066	2,270,750	2,476,286	1,736,250	5,646,066
1961-62	648,225	1,680,706	1,806,823	1,620,268	3,749,225	1,422,160	2,169,276	2,379,079	1,681,667	5,203,008

1/ Includes Government distribution.
2/ Includes, as available P_2O_5, 2 percent of the colloidal phosphate and 2 percent of the phosphate rock marketed for direct application.
3/ Includes, as total P_2O_5, 22 percent of the colloidal phosphate and 32 percent of the phosphate rock marketed for direct application.
4/ Not available. In 1962-63, total primary plant nutrients in all fertilizers amounted to 272 tons.
5/ Revised. Excess quantities of 1,980 tons of K_2O in mixtures in Kansas and 2,708 tons of total P_2O_5 in all fertilizers in Idaho were reported for 1962-63.

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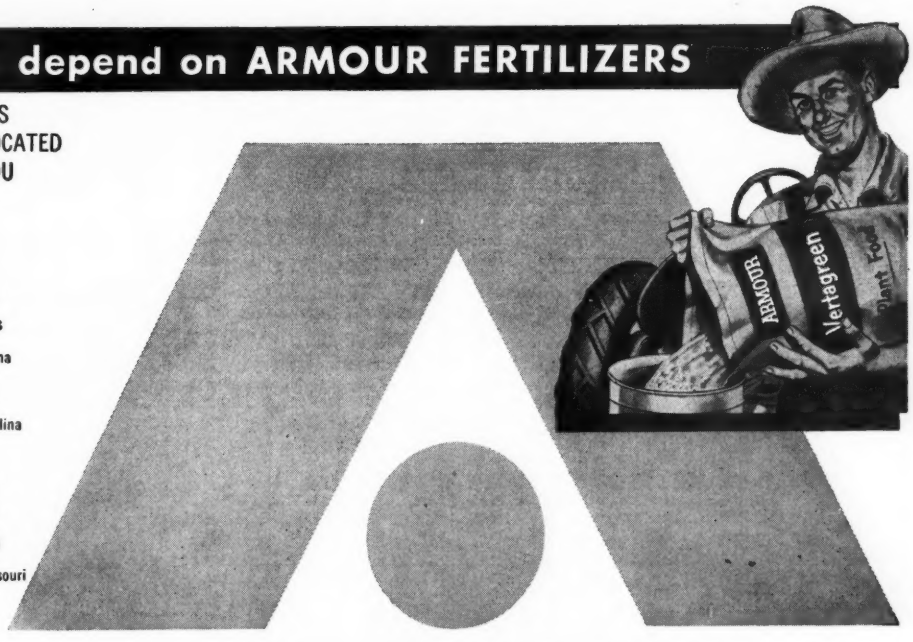

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TABLE 6a. Regional Distribution of Consumption of Primary Nutrients, as Percentages of Respective Totals in Mixtures and Materials, Year Ended June 30, 1954

Region	N		Available P_2O_5		K_2O	
	Mixtures	Materials	Mixtures	Materials	Mixtures	Materials
New England.....	2.75	0.36	2.01	1.45	2.57	0.95
Middle Atlantic...	11.75	1.76	11.64	5.51	11.31	1.48
South Atlantic ...	27.32	15.87	26.13	4.74	26.95	15.65
East. No. Cent....	20.04	9.78	27.25	12.74	32.50	35.63
West No. Cent....	12.13	16.05	13.26	22.60	8.59	8.26
East So. Cent.....	11.78	16.08	11.83	13.46	11.11	17.41
West So. Cent.....	5.59	12.93	4.76	13.43	3.82	11.43
Mountain.....	0.80	5.53	0.55	11.17	0.10	0.27
Pacific.....	3.59	19.35	1.63	14.16	1.10	4.97
Territories.....	4.25	2.29	0.94	0.74	1.95	3.95
United States...	100.00	100.00	100.00	100.00	100.00	100.00

Table 7. - Weighted Average Content of Primary Plant Nutrients in Fertilizers in Percent, Year Ended June 30, 1954[1]

State & Region	Mixtures[2]				Materials					Total Nutrients in Mixtures and Materials
					Single Nutrient[3]			Multiple Nutrients[3]	Total Nutrients	
	N	Available P_2O_5	K_2O	Total Nutrients	N	Available P_2O_5[4]	K_2O			
Maine	5.70	10.67	12.38	29.75	28.61	19.91	55.42	12.28	21.67	29.45
New Hampshire	5.29	12.07	13.13	30.49	29.84	20.36	53.56	10.41	22.43	28.67
Vermont	4.32	13.90	17.97	35.89	28.44	21.28	60.87	13.87	22.44	31.87
Massachusetts	5.88	9.36	9.42	24.65	28.78	18.46	60.38	11.29	16.82	23.18
Rhode Island	5.67	9.96	10.08	25.71	17.83	17.88	59.07	11.98	16.82	24.39
Connecticut	5.77	8.71	9.52	24.00	21.33	22.21	54.45	13.07	17.79	22.29
New England	6.08	10.27	11.64	27.99	22.73	20.68	57.69	12.48	19.01	26.61
New York	5.70	11.27	9.06	26.03	25.92	20.01	56.02	10.05	21.28	26.29
New Jersey	5.27	10.43	10.00	25.70	24.14	17.01	57.07	11.38	21.32	28.33
Pennsylvania	4.67	11.96	10.31	26.93	25.06	17.35	57.07	10.08	18.37	26.04
Delaware	4.85	13.09	11.28	27.22	34.48	22.58	58.82	8.06	22.55	27.84
District of Columbia	5.77	9.54	6.45	21.76	15.37	35.09	60.56	13.02	16.18	19.96
Maryland	4.34	11.32	9.85	25.31	24.66	16.63	12.65	12.09	19.27	24.92
West Virginia	3.96	12.36	9.30	25.64	21.62	19.22	59.74	9.92	19.18	24.96
Middle Atlantic	4.98	11.41	9.82	26.21	25.63	18.61	41.62	10.47	20.39	25.87
Virginia	5.84	11.00	10.17	24.71	19.91	18.43	14.06	10.15	18.63	23.94
North Carolina	5.98	9.80	8.43	21.91	19.96	18.18	37.38	11.62	20.07	21.89
South Carolina	5.77	8.92	8.41	22.10	20.10	16.22	53.21	20.26	22.60	22.21
Georgia	4.07	9.52	9.02	22.61	22.11	16.02	54.53	19.77	22.06	22.65
Florida	5.49	7.66	7.36	20.51	22.09	9.02	42.35	15.46	16.58	20.33
South Atlantic	4.23	9.37	8.87	22.17	20.66	14.99	40.16	16.63	21.22	22.01
Ohio	4.09	12.80	12.68	29.87	32.65	16.80	49.18	10.91	24.80	29.24
Indiana	4.34	13.74	14.69	32.78	36.07	14.18	58.58	9.99	21.52	32.62
Illinois	5.21	13.43	14.96	33.60	40.34	8.97	61.40	11.23	16.71	23.80
Michigan	4.10	14.01	13.84	31.96	31.94	16.62	51.37	9.11	23.15	31.16
Wisconsin	3.61	14.86	17.21	36.37	37.38	6.56	56.52	9.74	23.30	34.31
East North Central	4.31	13.56	14.32	32.19	37.17	7.16	60.22	10.22	19.65	29.07
Minnesota	4.84	20.16	14.60	39.60	46.45	34.11	69.44	28.97	38.08	39.27
Iowa	6.83	17.91	9.83	34.57	42.53	21.32	57.89	38.42	35.95	34.36
Missouri	7.10	14.96	11.19	33.25	44.27	6.74	58.33	23.27	21.48	28.77
North Dakota	7.17	16.86	5.49	29.51	33.17	48.36	60.80	51.78	47.28	43.52
South Dakota	8.90	20.74	1.86	32.19	44.89	39.69	55.10	37.82	40.91	37.01
Nebraska	11.30	20.28	2.40	33.98	47.29	33.66	60.80	33.23	43.11	40.08
Kansas	9.76	20.33	3.51	33.60	41.99	33.08	57.38	41.93	39.80	36.67
West North Central	7.08	17.78	10.21	35.08	44.36	19.98	58.28	38.80	32.80	34.14
Kentucky	4.24	11.16	10.44	26.04	32.80	22.66	63.73	7.99	29.97	26.91
Tennessee	4.36	11.23	9.77	26.26	32.74	24.93	49.80	14.60	31.62	26.82
Alabama	5.21	10.09	7.81	21.81	22.49	12.97	59.27	13.61	20.08	21.36
Mississippi	5.74	9.54	7.56	22.84	26.66	13.63	56.04	30.66	31.42	27.28
East South Central	4.49	10.48	8.89	23.83	30.89	16.62	54.43	13.94	27.26	24.81
Arkansas	5.49	10.94	11.71	28.14	34.84	23.52	57.07	37.80	37.38	32.55
Louisiana	6.33	11.49	9.06	26.87	36.61	16.78	57.30	34.45	33.52	29.89
Oklahoma	6.41	14.52	6.03	26.96	36.26	18.96	59.44	36.84	25.20	25.98
Texas	6.31	12.80	6.57	25.68	30.46	21.29	59.22	34.67	31.31	28.37
West South Central	6.10	12.31	6.56	26.07	36.89	20.37	57.24	36.04	32.64	29.68
Montana	9.38	21.23	0.99	31.60	29.17	47.33	60.50	45.18	40.70	39.47
Idaho	10.33	19.64	2.00	33.97	28.91	34.31	61.39	44.66	35.37	32.78
Wyoming	11.22	24.56	1.85	37.62	37.49	44.44	0	36.52	41.91	40.90
Colorado	11.11	22.97	3.51	37.09	46.26	44.41	59.15	13.82	43.91	41.76
New Mexico	11.48	15.00	2.28	28.74	56.18	32.77	0	35.91	40.06	36.96
Arizona	12.06	15.15	2.82	30.07	34.46	38.90	60.36	38.21	34.84	34.08
Utah	8.28	15.74	2.95	26.97	29.62	33.71	60.50	33.32	31.44	30.87
Nevada	7.79	12.48	4.24	24.51	23.53	36.89	60.50	33.25	30.93	29.29
Mountain	11.03	17.68	2.40	31.51	34.14	38.48	54.54	37.28	36.12	35.40
Washington	6.87	13.31	10.78	30.96	36.64	31.48	58.87	36.36	38.31	36.28
Oregon	9.19	16.39	9.59	34.17	28.37	24.49	59.97	37.80	30.25	30.90
California	10.78	9.96	5.56	26.30	30.61	26.69	52.61	12.87	23.14	23.78
Pacific	10.23	10.76	6.45	27.44	31.16	27.19	55.37	19.41	25.34	25.76
Continental U. S.	6.98	11.70	10.28	28.84	31.06	18.69	55.80	17.32	25.96	26.57
Hawaii	10.46	6.91	15.78	35.13	25.52	18.47	59.28	48.89	32.20	33.44
Puerto Rico	12.02	6.19	9.71	26.92	20.80	23.22	58.68	21.98	20.99	25.88
Alaska[5]	---	---	---	---	---	---	---	---	---	---
Territories	11.69	8.97	10.98	28.64	23.36	18.73	59.27	46.29	28.06	28.45
U. S. Average:										
1953-54	6.01	11.59	10.27	28.87	30.61	18.70	54.01	17.63	25.99	26.61
1952-53	4.63	11.34	[6] 9.87	[6] 25.84	28.54	14.48	51.89	21.96	23.24	[6] 25.05
1951-52	4.90	11.14	9.42	24.86	27.96	14.71	49.96	20.97	22.16	24.04

1/ Includes materials not guaranteed to contain N, P_2O_5, or K_2O.
2/ Guaranteed to contain two or more of the primary plant nutrients, N, P_2O_5, or K_2O.
3/ Guaranteed to contain only one of the primary plant nutrients.
4/ Includes the available P_2O_5 content of colloidal phosphate and phosphate rock as 2 percent and 3 percent, respectively.
5/ Not available.
6/ Revised.

consumption of available P_2O_5 took a downward turn in 1953–54.

Nutrients in Mixtures

The quantities and proportions of the nutrients consumed as mixed fertilizers in 1953–54 were 778,099 tons (42.12 per cent) for nitrogen, 1,801,423 tons (80.35 per cent) for available P_2O_5, 1,930,260 tons (72.92 per cent) for total P_2O_5 and 1,596,032 tons (88.37 per cent) for K_2O. The quantities of nitrogen, available P_2O_5, total P_2O_5 and K_2O consumed as mixed fertilizers were, respectively, 6.87, 1.07, 0.51 and 2.83 per cent greater than in 1952–53.

Nutrients in Materials

The quantities and proportions of the nutrients consumed as fertilizer materials in 1953–54 were 1,069,317 tons (57.88 per cent) for nitrogen, 440,677 tons (19.65 per cent) for available P_2O_5, 716,711 tons (27.08 per cent) for total P_2O_5 and 210,010 tons (11.63 per cent) for K_2O. The quantities of nitrogen and K_2O consumed as materials were, respectively, 17.64 and 12.78 per cent greater than in 1952–53, while the quantities of available P_2O_5 and total P_2O_5 were, respectively, 9.78 and 15.16 per cent less.

The total primary nutrient content of mixed fertilizers consumed in 1953-54 amounted to 4,175,554 tons, or 2.78 per cent more than the consumption (4,062,422 tons) in 1952–53. The total primary nutrient content of fertilizer materials in 1953–54 was 1,720,004 tons, or 8.61 per cent more than that (1,583,634 tons) in 1952–53.

The 1953–54 consumption of fertilizer materials containing primary nutrients was 195,987 tons (2.88 per cent) less than in 1952–53. The consumption of all fertilizers (materials and mixtures) containing primary nutrients was 1.67 per cent below the 1952–53 level, whereas the total quantity of primary nutrients supplied by these fertilizers increased 4.42 per cent.

Percentage Changes

The percentage change in consumption of primary nutrients in 1953–54 as compared with 1952–53 is shown by states and other political units in Figure 2. Percentage increases in nitrogen were generally highest in the West North Central and the West South Central States. These regions consumed 17.72 per cent of the total primary nutrients in mixed fertilizers and 28.98 per cent of the total in materials (Table 6a). The percentage change in nitrogen consumption ranged from a decrease of 13.08 per cent in Maine to an increase of 117.18 per cent in South Dakota. Wide variations are also shown in the percentage changes in the consumption of P_2O_5 and K_2O. ▲

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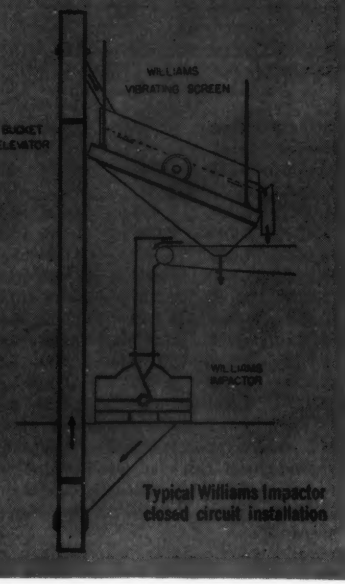

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H. H. Shepard's Report Shows Improved Inventories of Technicals, Formulations. Production and Consumption Reviewed.

USDA'S Pesticide Situation for 1954-55, prepared by Harold H. Shepard of the Commodity Stabilization Service, reports ample pesticide supplies, in general, for domestic requirements. As in the past, temporary or local shortages may arise from distribution problems.

A definite improvement in the inventory situation is noted with overall stocks of technical materials and the chemical content of formulations about 9 per cent lower on Sept. 30, 1954, than on the same date in 1953. In addition, stocks of technical grades in possession of producers and mixers was down about 16 per cent.

Here is a summary of Shepard's report:

Insecticides

DDT. Production: 90,712,000 lbs., Oct. 1, 1953, through Sept. 30, 1954; 27,380,000 lbs., Oct., 1954 through Jan., 1955. **Exports,** 1953-54: 42,753,000 lbs., compared to 31,905,000 lbs. the previous crop year. **Stocks:** (in hands of producers and mixers): About the same at end of Sept., 1954 as on that date of 1953. **1953-54 US consumption:** About 47 million pounds. **Exports:** Heavy movement offset a quiet domestic market; nearly 17 million pounds expected to be contracted through GSA purchases during first six months of 1955.

BHC. 1954 production: At reduced level with gamma content of all grades but lindane averaging 15.64 per cent.

Table 1. Percentage breakdown of BHC Sept. 30 manufacturers' inventories by grade for 1953 and 1954.

Grade	1953	1954
12-15% gamma	54.1	61.4
36-46% gamma	31.5	27.8
99% gamma (lindane)	11.8	7.9
Other grades	2.6	2.9

Domestic consumption, gamma basis (except lindane): About six million lbs.

Other chlorinated hydrocarbons. 1954 Consumption: Domestic up 30 to 35 per cent over 1953. **Stocks:** Reduced by producers during 1954 to about one half of Sept. 30, 1953. Producers and mixers reduced stocks at least 30 per cent. **Exports:** Considerable in 1954, especially dieldrin for malaria control.

Parathion. 1953-54 Domestic consumption: Over 3,500,000 lbs.

Malathion. Demand exceeded expectations.

Lead arsenate. Consumption: Uniform at about 16 million lbs. annually for last three seasons.

Calcium arsenate. 1954 Production: At new low. **Producers' stocks:** 4,100,000 lbs. at end of year from six million lbs. **US consumption:** About 3,300,000 lbs.

Pyrethrum. 1954 imports: 55,000 lbs. of 20 per cent extract from Kenya; 1,528,000 lbs. of flowers (whole and powdered) during 4th quarter. **Demand:** Good. **Supplies:** Ample. **Japan:** crop will be shorter in 1955; little will be exported. US exports in 1954 were 448,000 lbs.

Rotenone. Imports: Those of

Table 3. Aerial application of dusts and sprays in the US. Unit: 1,000.

Material	1953	1952	1951
Dusts, p	235,229	413,098	254,858
Sprays, g	47,019	36,238	27,189
Defoliants			
Dry, p	16,250	15,799	20,798
Spray, g	31,182	11,215	7,275
Grasshopper			
Dry, p	3,729	2,330	2,387
Spray, g	12	201	29
Urban Use			
Dry, p	198	37	140
Spray, g	583	1,470	1,163
Total Dry, p	255,406	431,264	278,182
Total Liquid, g	78,796	49,123	35,655

p—pounds. g—gallons.

Table 2—Disappearance and revised requirements of some major pesticides by crop years, 1950–51 to 1954–55.[1] Unit: 1,000 lbs.

	Domestic disappearance at producers' level				Requirements for domestic consumption in 1954–55
	1950–51	1951–52	1952–53	1953–54	
BHC, gamma (with lindane)	9,600	11,067	7,085	7,616	8,000–10,000
Calcium arsenate	39,583	4,735	7,000	3,190	3,500–10,000
Copper Sulfate [2]	122,449	98,182	79,852	74,054	40,000–65,000
2,4-D (acid basis) [3]	23,494	25,298	26,122	26,483	25,000–28,000
DDT	72,688	70,074	52,748	45,117	55,000–70,000
Lead arsenate	30,174	17,452	16,000	16,000	16,000–20,000
Parathion [3]	4,670	4,511	3,000	3,975	3,500– 4,000
Pyrethrum (flowers) [4]	7,098	6,729	8,113	7,679	7,000– 7,500
Rotenone (roots) [4]	7,027	3,520	4,468	6,428	5,000– 6,000
2,4,5-T (acid basis) [3]	2,822	2,937	4,625	———	3,000– 3,500

[1] Based on available information; crop year is from Oct. 1 to the following Sept. 30.

[2] Disappearance for all domestic uses, including industrial, calendar year basis; requirements stated for agriculture only but include plant nutrient as well as fungicide use.

[3] Export data not being reported separately, figures represent total disappearance at producers' level.

[4] Imports; includes advanced (powdered), also equivalent of pyrethrum extract imported in 1953–54.

rotenone-bearing roots rose about 45 per cent during 1953-54; 1,801,000 lbs. during 4th quarter, 1954, including 747,000 lbs. powdered. At no time in free supply during 1953-54. **Stocks:** Reports of nine manufacturers showed combined stocks on Sept. 30, 1954, at least 85 per cent above the 1953 date. **1955:** Supply expected to ease.

Ryania. Present Trinidad supplies believed ample for sugar cane borer control this year.

Fungicides

Copper sulfate. Production and exports: Down again in 1954. **Shipment for agriculture:** 11 per cent lower than 1953, 33 per cent below 1952.

Mercury. Consumption: 575,000 lbs. (including slime control).

Sulfur, ground. Supplies in manufacturers' hands: Average 35 to 40 million pounds each year at end of season.

Synthetic organic fungicides (captan, glyodin, dithiocarbamates). Proportionate use expanded. Wide acceptance for captan; demand for Karathane in powdery mildew control increased.

Herbicides

Over 85 million lbs. used in 1954 (agricultural and non-farm). **Exports:** 14,829,000 lbs., 1954; 11,954,000 lbs., 1953; 9,823,000 lbs., 1952.

2,4-D. Nearly 14 million acres of small grains and flax treated in area between Miss. river and Pacific coast in 1953. Some shift to low-vol formulations on West coast.

2,4,5-T. 1954 Production (acid basis): 51.6 per cent of 1953. Totaled 751,000 lbs. in Dec., 1954 and Jan., 1955.

Chloro-IPC. Sales, formulator level: 360,000 lbs. in 1953 and 470,000 lbs. in 1954. **Stocks:** Ample for 1955.

Defoliants

It appears that 3,500,000 acres were treated with defoliants in 1953.

Fumigants

Calcium cyanide sold well as a grain fumigant in 1954. Use of methyl bromide is growing for stored products and seed bed soil; a substantial quantity is exported to Brazil.

Use of soil fumigants for nematodes is increasing, and this market is estimated at five to eight million dollars. It is reported that about 900,000 acres of seed beds and fields were treated with D-D in 1954 and about twice that area with ethylene dibromide. Approximately 1.8 to 2 million lbs. of methyl bromide were also applied to soil, mostly to tobacco, celery and other seedbeds.

Dust Diluents

Quantities of principal materials were similar in 1953 to the 1952 consumption.

Table 6. Specified solid diluents used in formulating pesticides.
Unit: 1,000 lbs.

Diluent	1953	1952	1951
Talc and Soapstone	56,880	66,610	92,668
Pyrophyllite	69,730	70,162	73,274
Fullers' Earth	151,390	152,232	172,678
Kaolin	63,620	57,890	79,766
Bentonite	9,242	8,146	8,086

Emulsifiers & Wetting Agents

One group of emulsifer producers has estimated that farm chemicals producers will consume in 1955 about 10 million lbs. of emulsifiers, mostly in insecticide and herbicide liquid concentrates. Other estimates range from 8 to 12 million pounds. Total 1951 quantity is believed to have been about six million pounds.

Several million pounds of surface active agents are employed annually in manufacture of wettable powders. ▲

Table 4.—U. S. production of some major pesticides by calendar years, 1950-54 Unit: 1,000 lbs.

Pesticide	1950	1951	1952	1953	1954[1]
BHC, gross	76,698	116,988	85,090[2]	57,363[2]	59,312[2]
Gamma equiv.	10,200	17,100	12,800[2]	8,800[2]	9,275[2]
Calcium arsenate	45,348	40,900	7,634	7,260	2,758
Copper sulfate	174,600	213,872	189,016	145,434	130,568
2,4-D (acid basis)	14,156	17,671	30,718	25,928	28,408
2,4-D (esters)	9,416	11,592	21,108	18,826)	———
2,4-D (salts)[4]	2,212	5,532	3,933	4,836)	20,522
DDT	78,150	106,139	99,929	84,366	91,054
Lead arsenate	39,434	25,416	14,286	14,196	15,000
Methyl bromide	2,212	3,711	4,620	6,167	[3]
Parathion	[3]	4,638	2,365	2,999	[3]
Phenothiazine	4,034	5,486	5,914	3,700	[3]
2,4,5-T (acid basis)	[3]	2,456	3,398	5,281	2,725
TEPP (40% basis)	[3]	1,870	922	229	365
TCA, salts and esters	1,760	7,487	6,214	[3]	[3]
Ziram	1,087	1,511	934	1,152	[3]

[1] Preliminary. [2] Not including lindane. [3] Not available. 4 Sodium and amine salts.

Table 5.—Sales at manufacturers' level of pesticides for livestock use.

Type of pesticide	1951	1952	1953
	Gallons	Gallons	Gallons
Oil base sprays, used without dilution	1,529,701	1,511,163	1,758,182
Emulsion conc. to be diluted with water	208,061	125,970	119,244
	Pounds	Pounds	Pounds
Smears	———	———	98,440
Wettable powders	1,360,408	1,246,285	3,565,801

Table 7.—Final results of survey of stocks of 26 principal pesticidal chemicals held in U. S. at end of season (September 30)[1] Unit: 1,000 lbs.

Pesticide	Total stocks (technical plus mixtures), in terms of technical		Mixtures only, including concentrates, formulations, etc., in terms of technical	
	1953	1954	1953	1954
Aldrin (60% equiv.)	5,138	2,656	[2]	[2]
BHC (gamma, except lindane)	6,046	7,295	2,027	2,543
Calcium arsenate	8,439	6,444	789	835
Captan	[2]	[2]	[2]	[2]
Chlordane	1,436	1,735	697	831
Chloro-IPC	1,947	1,708	827	700
Copper sulfate	16,560	12,230	2,175	1,737
Cryolite	[2]	[2]	95	104
2,4-D (acid equiv.)	10,616	9,228	6,912	6,892
DDD (TDE)	3,458	2,336	[2]	[2]
DDT	22,372	27,386	9,549	10,791
Dieldrin	3,038	2,128	[2]	[2]
Dithiocarbamates	1,002	1,123	567	538
Heptachlor	1,348	1,011	[2]	[2]
Lead arsenate	9,338	6,434	2,702	1,358
Lindane	715	588	127	181
Malathion	234	1,667	135	421
Methoxychlor	165	275	113	212
Organic mercurials	[2]	[2]	[2]	[2]
Parathion	1,617	2,277	747	900
Sodium chlorate	6,879	6,306	[2]	[2]
Sodium TCA	1,230	2,222	[2]	[2]
Soil fumigants	[2]	[2]	[2]	[2]
Sulfur, ground	37,933	32,965	15,653	16,003
2,4,5-T (acid equiv.)	3,014	2,392	1,742	1,552
Toxaphene	15,596	10,188	4,147	4,721
Grand Totals	171,330	156,092	56,039	59,301

[1] In cooperation with National Agricultural Chemicals Association; estimated to be 90-95 per cent complete.

[2] Figures not released; stocks reported are included in grand totals.

(Photo — Courtesy Soil Conservation Service, U. S. D. A.)

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Record 3,522,213 tons of Salts Delivered in 1954. First Quarter, 1955 Shipments Show Big Gain.

Potash Deliveries at New High

AGAIN in 1954 potash deliveries reached a new high, reports the American Potash Institute. Deliveries in North America totaled 3,522,213 tons of salts containing an equivalent of 2,059,643 tons K_2O, an increase of 178,259 tons K_2O or 9 per cent over 1953.

Deliveries by the seven leading domestic producers were 1,909,255 tons K_2O, an increase of 11 per cent, while imports dropped 5 per cent to 150,388 tons K_2O.

Deliveries for agricultural purposes in the continental US were 1,834,810 tons K_2O, up 171,568 tons. Canada received 76,265 tons, Cuba 5,113, Puerto Rico 21,017 and Hawaii 18,252. Exports to other countries amounted to 12,377 tons.

Illinois led all states with receipt of over 216,000 tons K_2O, and was followed in order by Ohio, Indiana, Georgia, Virginia and Florida, each with over 100,000 tons.

90% for Agriculture

Agricultural potash accounted for over 90 per cent of deliveries. Muriate of potash comprised nearly 93 per cent of the farm material deliveries and sulfate of potash and sulfate of potash magnesia accounted for over 7 per cent. Manure salts were but an insignificant percentage of deliveries in 1954.

In the fourth quarter, deliveries totaled 980,469 tons of salts with an equivalent of 567,770 tons K_2O, an increase of 25 per cent compared to 1953.

The institute reports that information from Government and other sources indicates that, during the second half of 1954 there were additional imports of European potash into Cuba, the United States, Canada and Puerto Rico of 70,986 tons K_2O as muriate of potash and 18,881 tons K_2O as the sulfate. These figures are included in deliveries for the fourth quarter.

First Quarter, 1955

The largest tonnage ever shipped by American potash producers during any quarter was delivered during January-March, 1955. The total of 1,144,305 tons of salts containing an equivalent of 675,174 tons K_2O was an increase of 9 per cent in salts and 10 per cent in K_2O over the 1954 period. Here are the totals as tabulated by the American Potash Institute:

POTASH DELIVERIES

Calendar Year and Fourth Quarter 1954 and 1953
Short Tons K_2O

	Calendar Year 1954	Calendar Year 1953	Oct.-Dec. 1954	Oct.-Dec. 1953
AGRICULTURAL				
United States				
Muriate	1,703,481	1,553,945	435,716	350,290
Manure Salts	1,313	1,439	291	252
Sulfate and Sul. Pot-Mag.	130,016	107,858	47,186	34,737
Total	1,834,810	1,663,242	483,193	385,279
(Imports)*	(107,036)	(120,294)	(52,845)	(56,159)
Canada	76,265	72,501	39,475	36,774
(Eur. Imports)*	(33,141)	(32,781)	(32,732)	(28,008)
Cuba	5,113	6,267**	3,275	3,419**
(Imports)*	(3,025)	(1,758)	(1,925)	(1,758)
Puerto Rico	21,017	16,699	5,139	3,518
(Imports)*	(7,186)	(3,823)	(4,365)	(1,893)
Hawaii	18,252	19,437	3,986	3,403
Total Institute Countries	1,955,457	1,778,146	535,068	432,393
Other Exports	12,377	1,742	5,976	461
TOTAL AGRICULTURAL	1,967,834	1,779,888	541,044	432,854
(Imports)*	(150,388)	(158,656)	(89,867)	(87,818)
CHEMICAL	91,809	101,496	26,726	23,178
GRAND TOTAL	2,059,643	1,881,384	567,770	456,032
(Imports)*	(150,388)	(158,656)	(89,867)	(87,818)

* Import figures given in parentheses are included in all totals. ** Revised.

Potash Deliveries

(United States, Canada, Cuba, Puerto Rico, Hawaii)

	Jan-Mar 1955	Jan-Mar 1954
Muriate	591,010	*559,136
Manure salts	518	634
Su. and Sul. Pot. Mag.	335,102	*31,162
Total Agr.	626,630	*590,932
Chem. potash	28,191	22,157
Export	19,353	*1,273
Grand Total	674,174	614,362

* revised.

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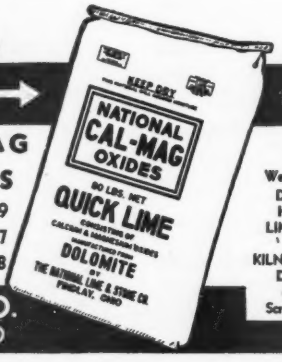

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by Dr. Melvin Nord

PATENT REVIEWS

Noncaking Fertilizers

US 2,702,747, issued Feb. 22, 1955 to Merton L. Studebaker and assigned to Phillips Petroleum co., describes a process for preparing fertilizers by coating ammonium nitrate or ammonium sulfate with a clay mineral such as bentonite rendered hydrophobic by base-exchange, using an organic base such as an amine or amine salt. The amine should have at least ten carbon atoms.

Whereas an adsorbent clay or diatomaceous earth offers comparatively little resistance to the passage of moisture vapor, an organophilic clay of the type disclosed here will only permit the transfer of moisture from the atmosphere to the prill if the moisture vapor pressure of the atmosphere is great enough to overcome the pressure drop across the capillary spaces of the moisture barrier. By building up a layer of the organophilic material to above a certain critical thickness, comparatively little transfer of moisture between the prill and the atmosphere will be encountered.

The patent describes a number of tests illustrating the use of the process, and the results obtainable from it.

Soil-Conditioning Fertilizer

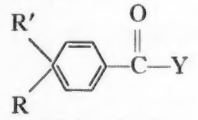
US 2,703,276, issued March 1, 1955 to Ross M. Hedrick and Quirino A. Trementozzi and assigned to Monsanto Chemical co., discloses the use of certain aqueous solutions for improving the physical structure of a soil and at the same time introducing nutrient elements into the soil.

In a previous patent (US 2,625,529) issued in 1952, Monsanto disclosed a method of soil-conditioning with water-soluble polymeric polyelectrolytes such as the copolymers of maleic acid with vinyl acetate. It has been found that chemical fertilizers destroy this soil-conditioning effect, when used in aqueous solution with the polyelectrolytes.

According to the present patent, it is possible to avoid this by using plant nutrients which are free of chloride, nitrate and sulfate ions. For example, phosphates, carbonates, bicarbonates or hydroxides may be used as plant nutrients with no deleterious effect on the soil-conditioner.

Herbicidal Compositions

US 2,703,751, issued March 8, 1955 to Dexter B. Sharp and assigned to Monsanto Chemical co., discloses new herbicidal compositions having the formula



where R and R′ are hydrogen, chlorine, alkyl radicals of 1 to 3 carbon atoms, or alkoxy radicals of 1 to 3 carbon atoms, and Y is an alkyl radical of 1 to 3 carbon atoms. For example, acetophenone phenylhydrozone may be used. The herbicide is used as an oil-in-water emulsion.

Method of Defoliation

Sodium chlorate is a defoliant for cotton and other plants, but it suffers from the disadvantage of being a fire hazard. If borax is added to the sodium chlorate the fire hazard is reduced; however, its low solubility in water makes it possible to use too small a quantity to be very effective in reducing the fire hazard.

In US 2,704,243, issued Mar. 15, 1955 to Frank J. Seibert and assigned to Chipman Chemical co., Inc., a polyborate such as sodium pentaborate ($Na_2B_{10}O_{16}\ .10H_20$) is used instead of borax ($Na_2B_4O_7$). The polyborate is markedly more soluble, and imparts pronounced fire resistance to plants sprayed with the chlorate mixture.

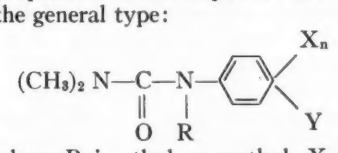
Dithiobiuret as a Defoliant Activator

According to Lyle D. Goodhue and Roy E. Stansbury, in US 2,704,244 (issued Mar. 15, 1955 and assigned to Phillips Petroleum co.), dithiobiuret and its derivatives increase the defoliating activity of organic polysulfides such as di-tert-hexyl disulfide.

The patent lists large number of dithiobiuret derivatives which have this effect.

Pesticide Tetra-substituted Ureas

In US 2,704,245, issued March 15, 1955, Norman E. Searle discloses a group of compounds which are effective for the control of fungi, which kill insects and mites, and which have valuable herbicidal properties. The compounds are of the general type:



where R is ethyl or methyl, X is halogen, n is 1,2, or 3, and Y is hydrogen or an alkyl of 1 to 4 carbon atoms. For example, 1-(p-chlorophenyl)-1, 3, 3-trimethylurea may be used.

The patent, which has been assigned to E. I. du Pont de Nemours & co., also list a number of other compounds of this type.

Isoparaffinic Hydrocarbons as Carriers for Chemicals which Affect Plants

According to Lyle D. Goodhue and Carolyn E. Tissol, in US 2,704,246 (issued Mar. 15, 1955 and assigned to Phillips Petroleum co.,) certain isoparaffinic hydrocarbons are advantageous carriers for chemicals which are to be applied to plants. They spread and cover large areas of plant surface, especially leaf surface per unit weight, providing films of almost molecular thickness. They carry the active chemical uniformly over a broad plant area, thus providing maximum coverage with minimum amount of chemical. These materials are substantially non-phytotoxic and are, therefore, advantageous where an inert carrier is required.

The carriers are highly branched hydrocarbons containing 9 to 20 carbon atoms, and boiling in the range of 260° to 700°F. They contain a minimum of 90 per cent isoparaffins by weight, with not more than 2 per cent of cycloparaffins, aromatics or olefins. ▲

PEST REPORTS

Presented in cooperation with the Economic Insect Survey Station, Plant Pest Control Branch, Agricultural Research Service, USDA.

Yellow Clover Aphid Continues Serious

THE yellow clover aphid, which in 1954 was first reported as being an economic pest of alfalfa, is fast becoming one of the major pests in the southwestern states. The aphid is spreading rapidly in California, as well as several other states. During March a total of 125,000 acres of alfalfa were treated in Imperial county and continued applications are necessary. In some fields treatments were being repeated every eight days. Infestations ranged from light to heavy in both San Bernardino and Riversides counties. Heavy infestations were found in the desert areas of San Diego county, but light in the coastal areas.

A rapid increase of the population was reported in all southern Arizona counties and the difficulty of control because of quick build-up was causing concern.

The aphid continued as the major crop pest in New Mexico the last of April. Infestations of epidemic proportions were recorded in the Pecos and Hatch valleys and damaging populations were noted throughout the southern half of the state. Activity continued to be reported from Texas with considerable damage to alfalfa in El Paso county.

Oklahoma reports very heavy infestations in the north-central area with some fields in Grady county needing to be replanted. In the Stillwater area some stands were reduced as much as 75 per cent.

The insect is now known to be in several Kansas counties but at the last report no controls had been required, although new destructive levels were found in some fields. Since this pest is proving rather difficult to keep under control, agricultural authorities within the respective states should be contacted for control recommendations.

Armyworm Causing Damage

Armyworms which during the past two years have caused heavy destruction are again causing damage in several states. Reports early in May state that outbreak numbers of small larvae were occurring in middle Tennessee. In Madison parish, La., counts up to 22 larvae per square foot were reported. Infestations were becoming very severe in oat fields where the soil was completely shaded. Outbreaks were continuing in western and northern Alabama counties.

Infestations in Georgia were light to heavy in practically every county south and west of Macon. Some oat fields were destroyed in Sumter and Houston counties before the damage was noted. Oats were destroyed and fescue cut back sharply in a heavy infestation in Carteret county, N. C. Counts up to 200 larvae per square yeard were recorded.

Moths were noted in flight at Newark, Del., April 21, and by the first of May specimens had been taken at Duluth, Minn., and Scarboro, Me. Larval infestations were reported from southern Illinois by late April and 153 moths were collected from a light trap in the eastern area of that state on April 23.

In Missouri economic infestations of small larvae were reported from the southeastern and southwestern corners of the state with moderate moth flights throughout the state. Kansas reported moths in grain fields of the central and southeastern areas the first week of May. Moths were also abundant in central Iowa.

European Corn Borer

Recent surveys in Iowa show a state average of 14,209 live borers per acre which is around three times as heavy at this time as a year ago when 4,183 borers were found per acre. Pupation was well underway in this state in early May and had reached 17 per cent in the central area by May 9.

By this time also pupation in Illinois ranged from 0-3 per cent in northern counties to 80 per cent in the southern area. Ten per cent pupation was recorded at Lafayette, Ind., May 3 and by May 7 pupation was getting underway in South Dakota.

In this latter state, a survival of around 77 per cent has been noted in some fields. Earlier in the spring winter mortality figures for the borer were received from North Dakota and Minnesota. An average mortality of 9.6 per cent was found for Cass, Richland, Barnes and Ransom counties, N. D. An average of 19 per cent of the borers examined in 28 counties in Minnesota were dead comparing with 25 per cent mortality in spring of 1954 and 20 in 1953.

Cereal and Forage Insects

By the first of May grasshoppers were hatching and causing concern in several areas. Populations of 50 to 100 nymphs per square yard were found in spots on the San Carlos Indian Reservation in Graham county, Ariz. In Texas counts up to 50 per square yard were reported from Falls, McLennan and Robertson counties. Newly hatched nymphs were found in all fields surveyed in 12 central and north-central Kansas counties. In Missouri the hatch was principally in the southern half of the state. Hatching began during the first week of April in southern Arkansas, and by the end of the month larvae were found in alfalfa and other forage crops in the north-

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western part of the state. Numbers appeared above normal for the time of year.

Various cutworms were causing damage in widely separated areas. The granulate cutworm was reported from many areas of Alabama as causing damage to cotton, corn, peanuts, vegetables and other plants. Clay-backed cutworms were especially destructive to small grain, lespedeza, clover and alfalfa in western and south-central Kentucky. The glassy cutworm caused severe damage to Merion blue grass in the mountainous area of Kern and Yolo counties, Calif. This species seldom causes damage in California. Tennessee, Utah and other states also reported cutworm damage.

The brown wheat mite caused damage to considerable acreage of wheat in Oklahoma. Approximately 7,500 acres were treated for this pest in the Kingfisher and Garfield areas alone. Damage continued in Kansas particularly to drought affected wheat. Counts of 50 to 300 per foot of drill row were recorded in many fields. Utah also reported damage from this mite.

Cotton Pests Building Up

Cotton insect activity began to pick up rapidly the first part of May. The brown cotton leafworm, which was of concern on cotton for the first time in 1954, has reappeared in eastern and south-central Texas and in Natchitoches and Bossier parishes, La. The pest caused serious damage in one field of seedling cotton in Louisiana and was found in many fields of young cotton in the Texas areas. Severe ragging by this leafworm in some Texas areas in 1954 warranted control on several thousand acres.

Boll weevil winter survival counts in Tennessee are considered to be very low with an average of only 62 live weevils found per acre in examinations in McNairy county. Among other pests causing concern on cotton were thrips, cutworms, aphids and spider mites.

Fruit Insect Activity

Fruit insect activity was underway by the first week of May. Codling moth adults were emerging in most of the eastern fruit areas as far north as southern New Jersey, Illinois and Indiana. First-brood larval attack is expected to be high in southern areas of the latter state. Plum curculio adults likewise were active over wide areas with some injury showing on plums in Westchester county, N. Y., and light injury to apples in southern Indiana. Abundant populations were recorded in Delaware, central Pennsylvania and at East Lansing, Mich.

Truck Crop Insects

Among the truck crop insects causing concern during early May were Colorado potato beetle and vegetable weevil. Colorado potato beetle was very numerous on potatoes and tomatoes on the Eastern Shore of Maryland and was damaging untreated potatoes in Delaware. Infestations in Arkansas were general but about normal. Vegetable weevil damage to vegetables in Arkansas was increasing. The pest was abundant in Alabama on cole crops and damaged tobacco plants at Aynor, S. C. ▲

Calendar

June 9-11—Annual outing of Mfg. Chemists' Assn. with SOCMA, Greenbrier hotel, White Sulphur Springs, W. Va.

June 12—Exec. committee, Fert. section, National Safety Council, Roanoke, Va.

June 12-15—Preliminary convention, National Plant Food Institute, Greenbrier hotel, White Sulphur Springs, W. Va. (joint meeting, American Plant Food Council and National Fertilizer Assn.)

June 21—Western Agric'l. Chemicals Assn., Hotel Clark, Los Angeles, Calif.

June 22-24—Pacific Slope Branch, ESA, Mission Inn, Riverside, Calif.

June 22-25—Assn. of Southern Feed and Fert. Control Officials 13th annual convention, Jung hotel, New Orleans.

June 27-29—Summer meeting, North Central Branch, American Society of Agronomy, Ames, Ia.

June 28-30—Sixth annual Pacific Northwest Plant Food Assn., Regional Fert. conf., Boise hotel, Boise, Idaho.

July 5-8—Plant Food Producers of Eastern Canada convention, Bigwin Inn, Muskoka, Canada.

July 14-15—Southwest Fert. conf. and grade meeting, Buccaneer hotel, Galveston, Tex.

July 21-22—Midwest Trade Show & Field Day, Great Plains Agr. Ammonia Assn., Business session and show; Hotel Ft. Des Moines, Des Moines, Ia.; Field Day, Ames, Ia.

July 27-29—Summer meeting, NE Branch, American Society of Agronomy, University Park (formerly State College), Pa.

Aug. 8-10—North Central div., American Phytopathological Society summer meeting, Wooster, O.

Aug. 9-11—Ohio Pesticide Institute meeting and field tour, Wooster, O.

Aug. 10—Ky. Fert. conf., Guignol Theatre, University of Kentucky, Lexington.

Aug. 15-19—American Society of Agronomy and Soil Science Society of American meeting, University of Calif., Davis campus.

Sept. 7-9—National Agric'l. Chemicals Assn. annual meeting, Spring Lake, N.J.

Sept. 7-9—9th annual Beltwide Cotton Mechanization conf., Texas A & M College, College Station, Tex.

Sept. 22-23—Chemical Market Research Assn., Cavalier hotel, Virginia Beach, Va.

Oct. 17-18—Fertilizer section, National Safety Congress, LaSalle hotel, Chicago.

Oct. 18-20—Canadian Entomological Society of America, Fredericton, B. C.

Oct. 25—Assn. of Consulting Chemists and Chem. Engineers forum and annual meeting, Belmont Plaza hotel, New York City.

Oct. 27—Middle West Soil Improvement Committee annual business meeting, Sherman hotel, Chicago.

Nov. 8-11—American Council of Independent Laboratories annual meeting, Westward Ho hotel, Phoenix, Ariz.

Literature

Proceedings, Second British Weed Control Conference, 1954. In two volumes, 500 pages. 30 shillings ($4.40) a set, obtainable from W. A. Williams, Association of British Insecticide Manufacturers, Cecil Chambers, 86 Strand, London, W.C. 2, England. Make checks payable to the British Weed Control Conference.

All formal papers and research reports presented at the conference are included in these volumes, together with an edited version of the discussion. There are also the reports of the Recommendations committee and others issued by the British Weed Control Council.

Manual of Excellent Managements, 1955 edition. 160 pages. $20.00, American Institute of Management, 125 E. 38th St., New York City 16.

A study of companies certified by the Institute as "excellently

managed" and the AIM standards for certification. It provides a full discussion of the ten key areas of the AIM management audit which includes a point system for comparisons of management in which the quality of the executives is weighed most heavily. An actual audit of Marathon corp. provides a working example of the analysis method.

It is termed a sound guide for management thinking, policymaking and overall corporate operation and can be used by the small investor to determine established standards for market choices.

Planning, Managing and Measuring the Business. 60 pages. $2.00. Controllership Foundation, Inc., 1 E. 42nd St., New York City 17.

A report designed to aid companies of any size in formulating future plans more effectively through a formal program of management planning and control, in keeping with their needs. It is based on a case study of the General Electric co. which was selected because it constitutes "a federation of highly autonomous businesses."

The material was originally presented as a symposium at the 1954 annual conference of the Controllers Institute of America.

Crop Protection by G. J. Rose. 223 pages. 30 shillings ($4.40). Leonard Hill Ltd., 9 Eden St., London, N.W. 1, England.

Written for the grower as a guide to protection of crops from the seed storage to the stored product. Four sections cover general considerations of pest control, pesticide materials, application methods and equipment and protection of stored products.

Statistics

Canadian Ammon. Sulfate

It is reported that Canadian ammonium sulfate producers had factory sales totaling 177,699 tons valued at $7,709,668 in 1954, compared to 186,540 tons and $8,200,-124 value the previous year.

Exports rose from 147,370 to 154,760 tons last year, while imports declined to 14,101 tons from 21,250 in 1953.

Feb. Superphosphate

February superphosphate production amounted to 210,185 short tons (100 per cent APA) according to the Bureau of the Census, an increase of less than one per cent over January output but 12 per cent over February, 1954, production.

Shipments of all grades totaled 137,259 tons, up 2 per cent from January and 7 per cent over the corresponding month last year. Stocks on hand at the end of the month were about the same as those held on Feb. 1, but were 21 per cent more than those on hand as of Feb. 28, 1954.

Boron Mineral Sales

Sales of boron minerals rose to 715,228 short tons valued at $17,668,000 in 1953, according to reports by producers to the Bureau of Mines, an increase of 23 per cent over 1952.

Domestic production, still confined to California, was carried out by five firms: American Potash & Chem. corp. recovering boron compounds from brine of Searles Lake, Trona; Pacific Coast Borax co. mining kernite from a bedded deposit in the Kramer district and colemanite at Death Valley Junction; United States Borax co. producing colemanite from a vein deposit near Shoshone; West End Chem co. recovering boron compounds from Searles Lake brine and Columbia-Southern Chem. corp. producing borax in Inyo county.

Production—February, 1955

Compiled from Government Sources

Chemical	Unit	February 1955	February 1954	January 1955
Ammonia, synth, anhydrous	s. tons	249,398	206,358	270,363
Ammonia liquor, coal & coke (NH_3 content)	pounds	2,353,872	3,035,913	2,797,620
Ammonium nitrate, fert. grade (100% NH_4NO_3)	s. tons	148,645	120,265	169,552
Ammonium sulfate				
synthetic (technical)	s. tons	98,239	63,193	103,001
coke oven by-product	pounds	143,563,519	133,869,544	158,890,242
BHC (Hexachlorocyclohexane)	pounds	1,824,331	5,367,965	*2,271,799
Gamma content	pounds	328,789	705,317	*440,411
Copper sulfate (gross)	s. tons	6,156	5,152	4,620
DDT	pounds	**9,319,119	6,965,696	9,359,355
2,4-D Acid	pounds	**2,792,270	2,138,035	2,503,198
esters & salts	pounds	**1,642,596	1,188,995	1,734,673
esters & salts (acid equiv.)	pounds	**1,238,165	———	1,361,796
Phosphoric acid (50% H_3PO_4)	s. tons	[1]286,523	234,740	*276,286
Sulfur, Native (Frasch)	l. tons	———	437,244	446,512
Recovered	l. tons	———	27,000	33,200
Sulfuric acid, gross (100% H_2SO_4)	s. tons	1,265,996	1,092,447	*1,312,811
Chamber process (100% H_2SO_4)	s. tons	225,969	216,578	226,775
Contact process (100% H_2SO_4)	s. tons	1,040,027	875,869	*1,086,036
Superphosphate (100% APA)	s. tons	210,185	187,464	*209,017
Normal (100% APA)	s. tons	144,737	143,847	*143,228
Enriched (100% APA)	s. tons	3,585	———	3,667
Concentrated (100% APA)	s. tons	61,225	43,010	*61,125
Wet Base (100% APA)	s. tons	638	607	*997
2,4,5-T Acid	pounds	**345,085	———	420,524

* Revised. ** Partly estimated. [1]Includes quantities for 1 plant previously not reporting.

FERTILIZER MATERIALS MARKET

New York

May 12, 1955

Ammonium Nitrate. A better movement was reported by producers as weather conditions improved in most areas. No price changes have been reported.

Nitrate of Soda. With stocks on hand at various ports ample to take care of expected seasonal demand, buyers only ordered this material as needed.

Urea. While some domestic producers report a good demand for this material, imported urea was moving rather slowly with last sales made at $115 per ton at Atlantic ports.

Nitrogenous Tankage. Prices of this material ranged from $4.10 to $5.10 per unit of ammonia ($4.98 to $6.20 per unit N), f.o.b. production points, with some producers reporting sold-up condition up to next Fall. Demand is expected to fall off, however, with the end of the present shipping season.

Castor Pomace. There is still a definite shortage of this material with last sales made on the basis of $37.50 per ton, f.o.b. production points, and little foreign material being offered. Buyers have been unable to secure their entire needs of castor pomace due to the limited production.

Feather Tankage. Because of its present low prices, feather tankage was in demand by fertilizer manufacturers at prices ranging from $4.75 to $5.25 unit of ammonia ($5.77 to $6.38 per unit N).

Organics. Trading was limited in organic fertilizer materials as most buyers waited to see what their needs would be for the balance of the season. Because of weather conditions, shipments are behind last year in some sections. Blood and tankage have been selling at about $5 per unit of ammonia ($6.08 per unit N), f.o.b. eastern shipping points. Soybean meal sold at $53 per ton, f.o.b. Decatur, Ill., for prompt shipments in bulk, and Cottonsead Meal was quoted at $60 per ton, f.o.b. Memphis, Tenn., with demand limited. Linseed meal was steady in price.

Fish Meal. With a limited amount of new menhaden fish meal coming on the market, prices remained firm at around $145 per ton, f.o.b. production points, with only limited amounts of imported fish meal being offered.

Bone Meal. Demand for this material has eased from both the fertilizer and feed trade and last sales were made on the basis of $70 per ton, f.o.b. production points. Some imported feeding bone meal was being offered at competitive prices.

Hoof Meal. Last sales made on basis of $6.50 per unit of ammonia ($7.90 per unit N), f.o.b. basis Chicago and demand has recently slowed down with more material being available.

Superphosphate. With stocks ample at most production points of both triple and regular superphosphate, buyers now find themselves in a comfortable position as far as these two materials are concerned for the first time in a number of years. No price changes have been noted.

Potash. Buyers were looking forward to new price schedules which are expected to be announced by the domestic producers a little later this month. It is expected that foreign potash will be offered for the coming season.

Philadelphia

May 12, 1955

No unusual activity is apparent in the raw materials market. There are ample supplies of everything with the possible exception of castor pomace and triple superphosphate. The general situation would seem to be about normal for this season of the year.

Sulfate of Ammonia. While there is improvement in demand, the supply is considerably on the long side and a fair accumulation of stocks may be expected. No price changes are reported.

Nitrate of Ammonia. Inventories are building up and the supply is well able to meet the demand, which producers are hoping will very shortly pick up.

Nitrate of Soda. Supply is sufficient to satisfy any current needs. Bulk prices continue at $43.50 per ton for domestic and $47.75 for imported, with $3.50 per ton extra for bags—both grades.

Blood, Tankage, Bone. After quite a depressed spell the market has strengthened, with blood at $5.25 to $5.50 per unit ammonia ($6.38 to $6.68 per unit N), and tankage $5 to $5.25 ($6.08 to $6.38 per unit N). Bone meal is quoted $72.50 to $75 per ton. While nitrogenous tankage is reported still on the scarce list, some material can be had at a premium.

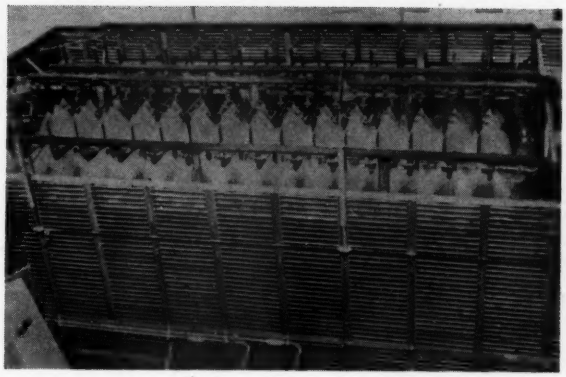
Castor Pomace. Lack of production leaves the market free of any offerings of this material.

Fish Scrap. There is practically no movement at this time pending arrival of the new catch. Some old catch has been quoted at $135 per ton to $140 for scrap, and $140 to $145 per ton for menhaden meal. The new season is expected to start the latter part of this month.

Phosphate Rock. Situation is reported as satisfactorily normal, with prices unchanged and stocks quite plentiful.

Superphosphate. Supply of normal grade is considerable and the demand rather quiet. The triple grade, however, is in short supply and well sold up. No price changes are reported for either grade.

Potash. The demand has been fairly strong and quite satisfactory thus far this season. New contracts are said to be in process, and it is expected prices will remain about as at present.



Unique Coolers at Galena Acid Plant

AT Eagle-Picher co.'s Galena, Kan., sulfuric acid plant, a unique development is solving a cooling problem reports National-US Radiator corp. Cast iron cooling sections, through which acid flows, serve both as heat transfer units for cooling acid and as filler for the water cooling tower.

Three advantages are cited: water savings, cooling provided in minimum space and lower initial cost from reduced area and elimination of a separate cooling tower. Both functions are combined in one space with a single catch basin, one set of water pumps and a minimum of piping.

Separate units are used to cool 98 per cent absorber tower acid and 93 per cent H_2SO_4 from the drying tower, each with full circulating capacity of 1000 gpm. The entire cooling area is blanketed with spray from a series of Binks Rotojet nozzles and about 40 per cent of the water ultimately contacts the sections.

Determining Water Quantities

To determine water quantities, final temperature of the coolest acid outlet (93 per cent acid) is compared to design ambient summer wet bulb temperature to find the Gross Temperature Differential (GTD). One third of this, but not less than 10°F, is considered a safe approach temperature between wet bulb reading and minimum water temperature of the system.

Temperature range for the entire water quantity is considered one third of the GTD. Using 40 per cent water effectiveness, actual maximum water temperature is determined. With this, plus minimum water temperature and required acid inlet and outlet temperatures, the log MTD is determined.

Equipped with concrete pit and louvered wooden enclosure the units resemble, from the outside, conventional wood cooling towers. Designed by National's Heat Transfer div., the coolers were installed as a component of a new Leonard-Monsanto designed contact acid plant by Leonard Construction co. Complete data is available—add 248 to the Reader Service card. ▲

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editorial

The TVA Announcement

IT SOUNDED like the same old TVA story—this time with diammonium phosphate instead of triple superphosphate. The announcement last month that the agency has begun production of this material contained quite a few figures evidently designed to show why it was necessary for the Government to again enter into competition with commercial operations.

The decision was accomplished, says Richard E. Bennett, in the face of opposition from the fertilizer industry and in the face of protests from senators and representatives. We contacted Mr. Bennett for his comments on this development and he has been kind enough to provide us with facts and figures based on his own knowledge of the situation—facts and figures that differ considerably from those issued by TVA. The industry as a whole is certainly familiar with the work of Dick Bennett, his activities in the National Fertilizer Association, his support of the Fertilizer Section, National Safety Council, and his position as head of Farm Fertilizers, Inc., Omaha, Neb., and Bennett Chemical Co., Denver, Colo.

FIRST, let's take a look at the current and potential markets for diammonium phosphate. TVA sees the possibility of a national market of several hundred thousand tons yearly and states that present commercial capacity is around 40,000 tons a year.

Bennett believes that *less than 12,000 tons of this material are now sold* each year and that the potential mentioned by TVA is "fantastic." It may be considerably more than the present market but, as he points out, sales of several hundred thousand tons yearly are "a long, long ways off."

Present commercial capacity of 40,000 tons according to TVA seems quite a distance from fact. Bennett says the five or six commercial producers have *combined capacity in excess of 100,000 tons* and that it is expected all producers would increase their capacity—if a market was available.

Pricing the material also shows considerable variation, with TVA announcing a price to wholesale purchasers of $110.49, bagged, f.o.b. Sheffield, Ala., a price they claim to be well above product costs. The agency also states that a commercial producer with an economical source of phosphoric acid and anhydrous ammonia could sell at about $120 per ton f.o.b. with margin for profit.

This latter point just isn't true, says Bennett. "*We can say and prove,*" *he states, "that no commercial producers of diammonium phosphate can sell at a price of $120.00 per ton and make a profit.*"

The announced TVA selling price of $103.32 per ton f.o.b. Sheffield in bulk, represents, says Bennett, the approximate cost to private producers of the basic ingredients—*providing no freight is paid on the phosphoric acid or anhydrous ammonia and ignoring all other cost factors.* Obviously no producer has this fortunate combination so the TVA price is actually under the cost of raw materials alone, for a private producer.

Bennett's company offers diammonium phosphate at $146.00 per ton, bagged, *delivered* to dealers and $141.00 per ton, bagged, *delivered* to distributors. In the same states that his company covers, TVA's price is from $20 to $25 less. It's hard to figure how such a situation is aiding private industry in developing a satisfactory market.

IT DOES not seem that TVA assistance is needed at all in developing a plant food market for this material. Bennett points out that his company and others are furnishing the chemical to colleges, county agents and experimental farms for observation in test plots. They are also working with dealers and farmers, and large numbers of tests are accomplished in this way. "We expect," he adds, "to continue this sort of a program over a good many states and to expand this program."

The high cost per ton is always a hurdle, he points out, but although many farmers buy on a "per ton" basis, most are well versed in fertilizer usage and know that the cost per unit is the basic consideration.

Now why is it necessary for a Government agency to jump into this picture, underselling present commercial producers and serving only to duplicate efforts already undertaken? We can see nothing to be gained from increased competition based on a sales price that is and will be impossible to meet under commercial conditions.

It does not seem that the industry or the agricultural population is served by such activities. Development of such a market as exists, on a sound commercial basis with realistic price policies and adequate promotional activity, will do far more to increase agricultural consumption of this material.

We hope that you, as a member of the industry, will continue to fight such developments and will lend support to efforts aimed at the discontinuance of unsound Government competition.

G. P. T. Jr.
Editor

Chemicals

209—Geigy Methoxychlor

For aerosol and spray formulations, Geigy Agricultural Chemicals suggests that you specify Geigy Methoxyclor. GM "20" is designed for use in the preparation of household sprays, dairy barn sprays, aerosols and other products where small amounts for methoxychlor are desired in the formulation, and GM "90" is a concentrated material for formulation of sprays and aerosol solutions. Pesticide formulators interested in Geigy as a source of methoxychlor can

CIRCLE 209 ON SERVICE CARD

210—Diluex Carriers

Better pesticide formulations are assured, says the Floridin co., through use of Diluex or Diluex A as a carrier or diluent. Both materials have been widely accepted as superior grinding or milling aids for technical grade toxicants and will discharge readily from commercial dust applicators providing uniform coverage and maximum fractionation of toxicant and carrier in the swath. For complete specifications and samples, pesticide formulators only can

CIRCLE 210 ON SERVICE CARD

211-217—Fairfield Data

Fairfield Chemical div. offers to insecticide formulators only, information and end-use data on a variety of products, as listed below. Included is typical formulations, sample label statements and other material about Pyrenone and related chemicals. Circle the appropriate numbers for products in which you are interested.

211—Herbicides
212—Special Aerosol Concentrates
213—Horticultural Spray
214—Cow Bomb
215—Livestock Sprays
216—CPR Dusts & Sprays
217—Auto. Cattle Sprays

218—Granular Attaclay

Formulators considering granular pesticides may well consider use of Granular Attaclay from Minerals & Chemicals corp. The market for these products is growing constantly and you can produce a superior product with this material, which works well with toxicants and suffers minimum breakdown in processing. Both the small package business and farm markets are developing rapidly for this type of formulation. For a new eight page bulletin with full technical data on Granular Attaclay, pesticide formulators can

CIRCLE 218 ON SERVICE CARD

219—Prentox Heptachlor

Prentiss Drug & Chemical offers, for immediate shipment, heptachlor as a 25 per cent wettable powder or a 2 lb. emulsion concentrate for use in your formulations. This versatile insecticide is a specific for many crop pests including alfalfa weevil, boll weevil, root worms and maggots and wireworms. Pesticide formulators interested in Prentiss as a source of heptachlor can

CIRCLE 219 ON SERVICE CARD

FREE INFORMATION to help you solve fertilizer, pesticide problems

Reader Service

220—Espersol Solvents

These products of Eastern States Chemical have been thoroughly tested for their acceptability as pesticide diluents, and production is rigidly controlled for uniformity. They are non-phytotoxic in concentrations normally supplied. The company recently opened a Chicago terminal which permits even faster delivery of short notice orders than in the past. For a catalog and specifications on Espersol solvents

CIRCLE 220 ON SERVICE CARD

221—V-C Triple Super

Virginia-Carolina Chemical reports that newly expanded triple superphosphate facilities at Nichols, Fla., and the company's years of skill in production combine to produce Natural-Texture Triple Super to fit your production programs. The desirable texture aids you with simpler and faster ammoniation. Fertilizer manufacturers interested in V-C as a source of triple super can

CIRCLE 221 ON SERVICE CARD

How to use the READER SERVICE CARD

- **Circle number of literature you want.**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

Process Equipt.

222—Blue Valley Granulator

Considering granulation? It may pay you to investigate installation of a Blue Valley granular designed by leading engineers in the granulation field. Results can include reduction in curing time to hours, lowered plant inventories, increased profits and a higher quality product. To contact Blue Valley, fertilizer producers can

CIRCLE 222 ON SERVICE CARD

223—Williams Roller Mills

Better fine grinding—improved accuracy, uniformity and output at reduced cost are obtained with Williams roller mills. Instant adjustment permits grinding from 20 mesh down to 400 mesh and even to micron sizes, and finished products can be maintained at finenesses of 99.9 per cent plus, passing 325 mesh. Positive, self-adjusting feeding and blending of raw materials is automatic and a continual rising current of cool air sweeps ground material upward to the classifier where finished fines are separated from tailings which are all returned for further grinding. For literature

CIRCLE 223 ON SERVICE CARD

224—General American Catalog

A catalog from General American Transportation completely describes services and products offered by the firm including drying, mixing and evaporating equipment for the chemical and fertilizer industries. Expert service is available to meet a wide range of demands for drying equipment, and GA Louisville driers are made in sizes ranging from lab pilot models to large units requiring two railroad cars for shipment. Expert service is backed by testing and research labs and pilot experimental plants. For a catalog

CIRCLE 224 ON SERVICE CARD

225—Omega Feeders

In production of fertilizers or pesticides, Omega weighing feeders offer closer formulation, lower production costs and greater flexibility. The units provide precise control of ingredient proportions, and individual feed rates are instantly adjustable to fulfill various formula requirements. For an application bulletin on "Continuous Automatic Proportioning in Fertilizer Production" with full information on Omega feed lines for the plant foods industry,

CIRCLE 225 ON SERVICE CARD

226—Liquid Fert. Plants

According to Midstate Machinery co., all you need to enter the liquid mixed fertilizer business is a minimum of $8,600. For this or more they furnish equipment, training, formulas, cost data, supply sources and merchandising aids. The package plants are available in capacities from 10 to 50 tons per hour and the price quoted above buys a 15 tph unit. For complete information

CIRCLE 226 ON SERVICE CARD

227—Hum-mer Screens

W. S. Tyler has a catalog available on its Hum-mer Screens used for fast, accurate, high tonnage separation of fine and medium sized materials. When materials come in contact with the vibrated surface of the unit, coarser materials are forced to the top of the bed, and finer particles quickly reach the surface of the screen where separation takes place. There are no gears, belts or pulleys involved and power consumption is said to be negligible. For a copy

CIRCLE 227 ON SERVICE CARD

228—Remote Feed

A proportioning system permitting remote dialing and weighing of individual feed ingredients is described in a new 8 page bulletin by Richardson Scale. It discusses the operation of the Select-O-Weigh system describes three different installations of varied formulating capacities.

CIRCLE 228 ON SERVICE CARD

229—Plant Lighting

A Benjamin Electric bulletin of special interest to plant managers describes the firm's complete line of explosion-proof and dust-tight lighting equipment for use in various hazardous locations. All units are designed to provide maximum lighting efficiency and adequate protection in such locations under the National Electric Code and have passed rigid Underwriters' Lab tests for specific locations.

CIRCLE 229 ON SERVICE CARD

Packaging

230—Snap-Open Sacks

Hudson Pulp & Paper's new Snap-Open Sack opens easier and faster than **any** other bag, resulting in faster handling and reduced product spilling for your customers. Hudson says that this unit is the result of asking, in the field, your customers what they wanted in a multiwall. You can offer customers multiple advantages with goods bagged in these new sacks, and Hudson is pre-selling the idea with ads in farm magazines and consumer publications. For more information on the sacks and use of this development in increasing your sales

CIRCLE 230 ON SERVICE CARD

231—Kraftpacker

Kraft Bag's new Kraftpacker automatic open mouth bag filling machine increases production and reduces packaging costs at an "almost unbelievable rate." Accuracy to within a few ounces even at speed to 24-100 lb. bags a minute is maintained with only one operator. Purchase price is low, says Kraft, and little maintenance is required for steady operation. Manufacturers and mixers interested in seeing a machine in operation can use the RS service to arrange a date at a nearby point.

CIRCLE 231 ON SERVICE CARD

232—ET Bagpacker

International Paper describes its model ET Bagpacker as the perfect teammate for your present filling and weighing equipment. One operator can finish 15 bags a minute when provided with continuous delivery; the unit adjusts to bags from 25 to 100 lb. capacity and the model ET is caster-mounted for easy movement. For a booklet with complete details and drawings

CIRCLE 232 ON SERVICE CARD

233—Sacking Scales

Exact Weight produces heavy duty model 1120 scale for manual sacking and checkweighing fertilizer and model 2225 designed for a complete bagging operation from overhead hopper or manually. With the 225 unit, one man can bag, weigh and check up to 100 tons of free flowing material per day. Savings in labor costs and elimination of overweights can quickly pay for installation, says Exact Weight Scale. For full information on sacking scales

CIRCLE 233 ON SERVICE CARD

234—Storing Solutions

For bulk storage of nitrogen solutions, Butler Mfg. co. produces both welded horizontal and bolted vertical tanks of special alloy, non-corrosive aluminum. The vertical units, for non-pressure solutions, hold 22,000 gallons and the horizontal, low-pressure tanks are available in 12,000 and 22,000 gallon capacities. If you are now handling solutions or are considering the possibilities of such an operation, get full information

CIRCLE 234 ON SERVICE CARD

235—Visible Gauges

Squibb Taylor produces Visible float gauges for any application, including storage facilities for anhydrous ammonia. The company claims the finest in craftmanship and materials, accurate calibration and thorough testing. For details and prices on gauges for ammonia storage

CIRCLE 235 ON SERVICE CARD

236—Howe Compressors

Howe ammonia gas transfer compressors provide maximum efficiency with 100 per cent protection against liquid ammonia slugging. Built-in safety features guard the compressor without need of suction tank. Design also eliminates the need for an oil separator. The company can make immediate shipment from stock. For literature

CIRCLE 236 ON SERVICE CARD

237—Henry Valves

A wide variety of ammonia valves and steel fittings are available from Henry Valve for both direct application and industrial equipment. Included are high capacity shut off valves, with reversible nylon seat and tank shut-off units with nylon seat and full one inch diameter ports. For current catalogs

CIRCLE 237 ON SERVICE CARD

238—Custom Blending

Interested in having your own liquid or water soluble fertilizer custom blended? Davies Nitrate offers this service with trained personnel, specialized methods and close laboratory control. If you would like to consult with Davies on such an arrangement

CIRCLE 238 ON SERVICE CARD

239—Marietta Silos

A Marietta-designed storage system can improve your handling facilities and lower operating costs. Concrete stave silos are now coated with silicones for greater protection of raw materials. Full 3⅝ inch thick precast staves and heavy hooping are more than ample to support vibrators, shaker screens and other equipment on silo tops or sides. Staves can be supplied cast from lightweight aggregate. For a catalog with details

CIRCLE 239 ON SERVICE CARD

240—Baughman Spreaders

Baughman lime and fertilizer spreaders are equipped with ground drive and hydraulic distributor so that volume and width of spread are unaffected by gear shifting, stopping and starting or engine speed. A spread chart quickly tells you which of the 60 end gate settings to use for a desired volume. For new literature

CIRCLE 240 ON SERVICE CARD

241—Drum Cleaning

A bulletin from American Wheelabrator & Equipt. on cleaning steel drums shows how abrasive blast cleaning is used at several plants.

CIRCLE 241 ON SERVICE CARD

See the Industry News section, pages 24-25 for information on these Reader Service numbers—

242—New Payloaders
243—New Leader Test Box
244—S/S Spray Head
245—S/A Bearing Unit
246—Finco Sprayers
247—St. Regis Closure
248 for Acid Coolers (See page 63)

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KBH Corp., Clarksdale, Miss.

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J. C. Carlile, Corp., Denver, Colo.

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AMMONIUM SULFATE
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Schmutz Mfg., Louisville, Ky.

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Stedman Foundry and Machine Co., Aurora, Ind.
Union Bag & Paper Corp., New York City

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BIN LEVEL CONTROLS
Stephens-Adamson Mfg. Co., Aurora, Ill.

BIN DISCHARGERS
Stephens-Adamson Mfg. Co., Aurora, Ill.

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Ashcraft-Wilkinson Co., Atlanta, Ga.
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Jackle, Frank R., New York City
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Keim, Samuel D., Philadelphia, Pa
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa

BULK TRANSPORTS
Highway Equipment Co., Cedar Rapids, Ia.

CALCIUM ARSENATE
American Agricultural Chemical Co., N. Y. C.

CAR PULLERS
Stephens-Adamson Mfg. Co., Aurora, Ill.

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Stedman Foundry and Machine Co., Aurora, Ind.

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CHEMISTS AND ASSAYERS
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CHLORDANE
Ashcraft-Wilkinson Co., Atlanta, Ga

CLAY
Ashcraft-Wilkinson Co., Atlanta, Ga

CONDITIONERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

CONVEYORS
Link-Belt Co., Chicago, Ill
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sturtevant Mill Co., Boston, Mass.

COPPER SULFATE
Tennessee Corp., Atlanta, Ga.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa

CUSTOM PESTICIDE FORMULATION
Barco Chemicals, Inc., Des Moines, Ia.

DDT
Ashcraft-Wilkinson Co., Atlanta, Ga.

DIELDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

DILUENTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.
Summit Mining Corp., Carlisle, Pa.
Thomas Alabama Kaolin Co., Baltimore, Md.

DITHIOCARBAMATES
Berkshire Chemicals, New York City

DUST APPLICATORS
Raw Materials Trading Co., New York City

ELEVATORS
Power-Curve Conveyor Co., Denver, Colo.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.

ENDRIN
Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Marietta Concrete Corporation, Marietta, Ohio
Stedman Foundry and Machine Co., Aurora, Ind
Sturtevant Mill Co., Boston, Mass.

FERTILIZER—Liquid
Clover Chemical Co., Pittsburgh, Pa.

FERTILIZER—Mixed
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Co., div. of W. R. Grace & Co. Baltimore, Md
International Min. & Chem. Corp., Chicago, Ill.

FILLERS
Bradley & Baker, N. Y. C.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH
Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES
American Agricultural Chemical Co., N. Y. C.
Berkshire Chemicals, New York City
Metalsalts Corp., Hawthorne, N. J.
Tennessee Corp., Atlanta, Ga.

HERBICIDES
American Potash & Chemical Corp., Los Angeles, California
Barco Chemicals, Inc., Des Moines, Ia.
Lion Oil Company, El Dorado, Ark.

HERBICIDES—Oils
Lion Oil Company, El Dorado, Ark

HOPPERS & SPOUTS
Stedman Foundry and Machine Co., Aurora, Ind,
Sturtevant Mill Co., Boston, Mass.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agricultural Chemical Co., N. Y. C.
American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., Atlanta, Ga.
Barco Chemicals, Inc., Des Moines, Ia.
Berkshire Chemicals, New York City
Fairfield Chem. Div., Food Mach. & Chem. Corp., New York City
Pennsylvanna Salt Mfg. Co., of Wash. Tacoma, Wash.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo

IRON SULFATE
Tennessee Corp., Atlanta, Ga

KAOLIN
Thomas Alabama Kaolin Co., Baltimore, Md.

LEAD ARSENATE
American Agricultural Chemical Co., N. Y. C.

LIMESTONE
American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
National Lime & Stone Co., Findlay, Ohio

MACHINERY—Acid Making and Handling
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Stedman Foundry and Machine Co., Aurora, Ind
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Acidulating
Chemical Construction Corp., New York City
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Grinding and Pulverizing
Bradley Pulverizer Co., Allentown, Pa.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind
Sturtevant Mill Co., Boston, Mass.
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

Buyers' Guide

MACHINERY—Material Handling
Clark Equipt. Co., Construction Mach. Div., Benton Harbor, Mich.
Hough, The Frank G. Co., Libertyville, Ill.
Jaeger Machine Co., Columbus, O.
Link-Belt Co., Chicago, Ill.
Poulsen Co., Los Angeles, Calif.
Power-Curve Conveyor Co., Denver, Colo.
Sauerman Bros. Inc., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Mixing and Blending
Munson Mill Mach. Co., Utica, N. Y.
Pousen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Mixing, Screening and Bagging
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Power Transmission
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY
Superphosphate Manufacturing
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MAGNESIUM SULFATE
Berkshire Chemicals, New York City

MANGANESE SULFATE
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, Washington, D. C.

MINOR ELEMENTS
Tennessee Corporation, Atlanta, Ga.

MIXERS
Munson Mill Mach. Co., Utica, N. Y.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

NITRATE OF POTASH
Berkshire Chemicals, New York City

NITRATE OF SODA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
McIver & Son, Alex. M., Charleston, S. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
Commercial Solvents Corporation, New York City
Mississippi River Chem. Co., St. Louis, Mo.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.

NITROGEN MATERIALS—Organic
American Agricultual Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Smith Rowland Co., Norfolk, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

ORGANIC MERCURY COMPOUNDS
Metalsalts Corp., Hawthorne, N. J.

PARATHION
Ashcraft-Wilkinson Co., Atlanta, Ga.

PHOSPHATE ROCK
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa

PHOSPHORIC ACID
American Agricultural Chemical Co., N. Y. C.

PLANT CONSTRUCTION—Fertilizer and Acid
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

POTASH—Muriate
American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
Bradley & Baker, N. Y. C.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, Washington, D. C.
Southwest Potash Corporation, New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate
American Potash & Chemical Corp., Los Angeles, California
International Min. & Chem. Corp., Chicago, Ill.
Potash Co. of America, Washington, D. C.

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

REPAIR PARTS AND CASTINGS
Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

SCALES—Including Automatic Baggers
Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

SCRAPER MACHINES
Sauerman Bros., Inc., Chicago, Ill.

SCREENS
Atlanta Utility Works, The, East Point, Ga.
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

SEPARATORS, AIR
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

SHOVEL LOADERS
Clark Equipt. Co., Benton Harbor, Mich.
Hough, The Frank G. Co., Libertyville, Ill.
Jaeger Machine Co., Columbus, O.

SOLVENTS
Crowley Tar Products Co., New York City
Richfield Oil Corp., Los Angeles, Calif.

SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

SPREADERS, TRUCK
Highway Equipment Co., Cedar Rapids, Ia.

STORAGE BUILDINGS
Butler Manufacturing Co., Kansas City, Mo.
Marietta Concrete Corporation, Marietta, Ohio

STORAGE TANKS
Broadway Rubber Corp., Louisville, Ky.
Butler Manufacturing Co., Kansas City, Mo.
Cole, R. D., Manufacturing Co., Newnan, Ga.

SULFATE OF AMMONIA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TANKS—NH3 and Liquid N
Broadway Rubber Corp., Louisville, Ky.
Butler Manufacturing Co., Kansas City, Mo.
Cole, R. D. Manufacturing Co., Newnan, Ga.
KBH Corporation, Clarksdale, Miss.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr., Chem. Div., Pittsburgh, Pa.

TRUCKS—SPREADER
Highway Equipment Co., Cedar Rapids, Ia.

UREA & UREA PRODUCTS
Bradley & Baker, N. Y. C.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C

VALVES
Monarch Mfg. Works, Inc., Philadelphia, Pa.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.

GRADUATION—GIANTS OF THE FUTURE

Congratulations to the June graduates!

These men and women will be taking their places in the business and community life of America.

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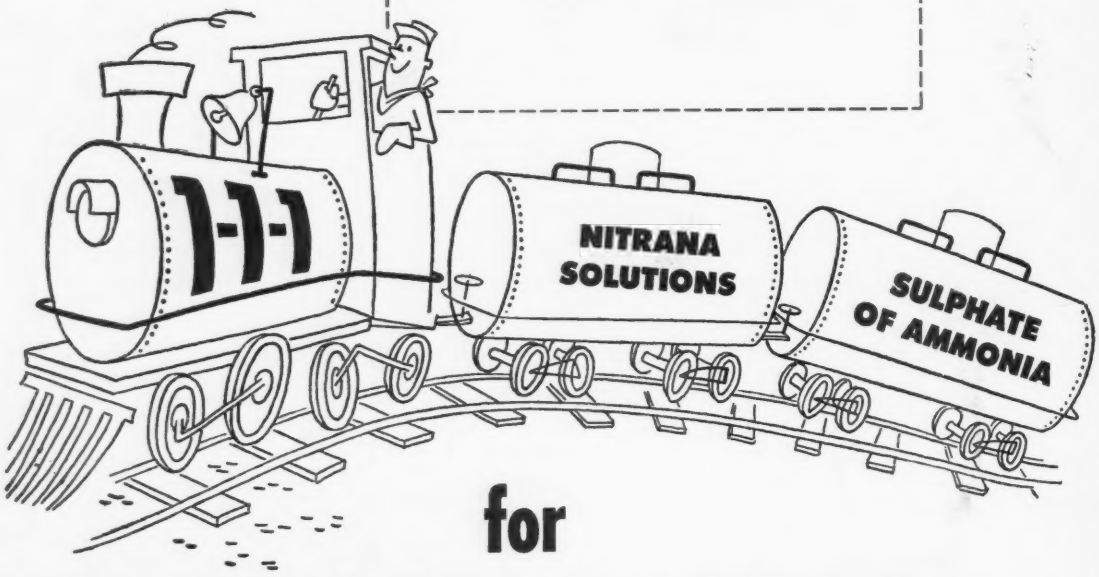
On the right track



for Nitrogen balance in 1-1-1 ratios

High-analysis 1-1-1 ratio fertilizers are in fast-growing demand by farmers. The increasing call for 8-8-8, 10-10-10 and 12-12-12 emphasizes the need for a practical means of building nitrate and ammonia nitrogen balance in these popular grades.

ARCADIAN® Nitrogen Solutions and Sulphate of Ammonia turn the trick. This economical combination is all you need to produce 1-1-1 and other ratio mixtures which cure quickly, with better granulation, less dust and better handling qualities. For details on this practical way to better fertilizers for your trade, consult a Nitrogen Division technical service representative. His services are available to customers at no cost.

Arcadian

PRODUCTS FOR PROFITABLE FARMING

Nitrogen Solutions
(NITRANA® and URANA®)

Sulphate of Ammonia

AMERICAN
Nitrate of Soda

A-N-L®
Nitrogen Fertilizer

Urea Products

NITROGEN DIVISION, Allied Chemical & Dye Corporation

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Indianapolis 20, Ind. • Hopewell, Va. • Columbia 1, S. C.
Atlanta 3, Ga. • San Francisco 3, Cal. • Los Angeles 15, Cal.

NITROGEN DIVISION ALLIED CHEMICAL